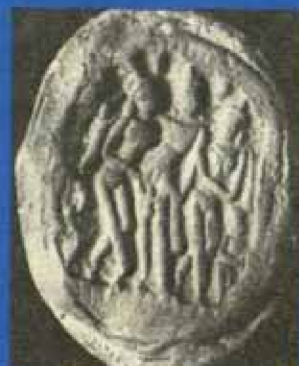
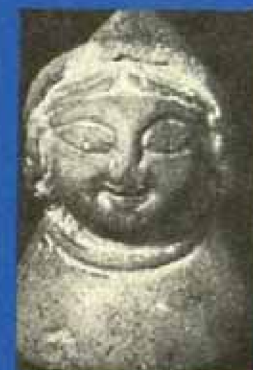
Indian Archaeology

1988-89—A REVIEW









INDIAN ARCHAEOLOGY 1988-89
— A REVIEW

EDITED BY
M.C. JOSHI

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Cover:
Harsh-ka-Tila, Thanesar, District Kurukshetra, Haryana
Top : left, human foot, Gupta period and centre,
plaque, Kushana period, both terracotta;
right, stone bust, Rajput period
Bottom : TSR—1, excavated remains,
Sultanate and Mughal periods

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PREFACE

In our effort to bring the publication of the *Indian Archaeology—A Review* up to date, we have been able to publish *Indian Archaeology 1988-89—A Review* not very long after the publication of the issue for the year 1987-88. If the contributors send us the matter well in time, it may be possible for us to publish the *Review* regularly. This would depend on the co-operation of my colleagues in the Survey and the State Departments of Archaeology and Museums, the Universities and other institutions.

The present issue of the *Review* contains, as usual information about the multifarious activities in the field of archaeology all over the country besides the efforts that the Archaeological Survey of India has been making outside its geographical boundaries. Of the excavations reported in this issue, I would like to mention the work by the Survey at Chechar and ancient site of Vaishali in Bihar, St. Augustine Church at Old Goa, Thanesar in Haryana, Hampi in Karnataka, Balwara, Daulatabad and Adam in Maharashtra, Lalitagiri in Orissa, Sanghol in Punjab and Fatehpur Sikri in Uttar Pradesh; at Sannati in Karnataka jointly by the Survey and the Society for South Asian Studies, U.K., and at Sravasti jointly by the Survey and the Kansai University, Osaka, Japan, besides the work at Kuntasi, jointly by the Deccan College, Pune and the Gujarat State Department of Archaeology, Elchuru by the Andhra State Department of Archaeology, at Nagwada by the M.S. University, Baroda, at Ter by the Department of Archaeology and Museums of the Maharashtra Government, at Nagiari by the Punjab State Archaeology, at Purola by the Garhwal University, Srinagar (Garhwal), at Mangalkot by the Department of Archaeology, Calcutta University and at Shikarpur by the Department of Archaeology, Government of Gujarat. Details of conservation and other works carried out by the Survey and the different State Departments within the country have also been included, the reference to some of which would not have been out of place, but the paucity of space refrains me from doing so. I would however like to mention here that the Survey continued to carry out the major work of structural conservation and chemical preservation of the Library, southern portion of esplanade, parts of the third and fourth enclosures and the moat of the Angkor Vat in Cambodia.

The credit for bringing out the present issue of the *Review* mainly goes to my colleagues in the Publication Section of the Survey especially Shri B.M. Pande, Director (Publications), and his associates, Shri C. Dorje, Superintending Archaeologist, Dr. (Km.) Arundhati Banerji, Dy. Superintending Archaeologist, Shri J.C. Gupta, Production Officer, Shri K.P. Padhy and Shri A. Jha, Assistant Archaeologists for which I am highly grateful to them.

M.C. JOSHI
Director General

19 March 1993

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INDIAN ARCHAEOLOGY 1988-89—A REVIEW

L EXPLORATIONS AND EXCAVATIONS

ANDHRA PRADESH

1. EXPLORATION IN DISTRICT ANANTAPUR.—The Department of Archaeology and Museums, Government of Andhra Pradesh, reported the discovery of a rock-shelter having paintings in red-ochre colour, on the hillock near village Budagavi, 6 km north-west of Uravakonda. The painted figures include bulls, cows, antelopes, human figurines, flying birds, hand impressions, etc.

2. EXCAVATION AT NELAKONDAPALLI, DISTRICT KHAMMAM.—In continuation of the last year's work *(Indian Archaeology 1987-88—A Review,* pp. 2-3), the Department of Archaeology and Museums, Government of Andhra Pradesh, conducted excavation at Nelakondapalli, with a view to exposing the stupa. The excavation revealed that the stupa consisted of circular central hub connected by five radiating walls, the abutting circular drum and circumambulatory passage, and the *ayaka* platform, with attached staircase, all in brick masonry. Traces of lime plaster were noticed at places in the circumambulatory passage. Except a few beads of terracotta and semi-precious stones, no other antiquities were found. Red ware and tan ware of the early historic period were also collected from the site.

3. EXPLORATION IN DISTRICT KURNOOL.—During the course of exploration around the Srisailam temple complex (16°5' to 16° 8' 30" N; 78° 50' 45" to 78° 53' 15" E), K. Thimma Reddy, D.R. Raju and N. Chandramouli of the School of History, Culture and Archaeology, Telugu University, Srisailam, identified the following sites of archaeological interest:

Site/Locality	*Period*	*Artefacts*	*Material*
Bhimuni Kolanu ancient foot-path	Middle and upper Palaeolithic	Flakes, blades, scrapers microlithic, raw material and debitage	Chert, quartzite, quartz vein
Filter House	Middle palaeolithic	Flakes, flake blades, scrapers	Quartzite and quartz vien
Guest House	Lower and Middle palaeolithic	Handaxes, cleavers, picks, grinding stones (?), scrapers, flake blades	Quartzite and quartz

[1]This publication is referred to in the following pages by the year only

Site/Locality	*Period*	*Arttfacts*	*Material*
High School	Middle and Upper Palaeolithic	Blades, scrapers, points, flakes, flake blades	Quartzite
Manikyeswaramma Ashram	Lower and Middle Palaeolithic	Handaxes, cleavers, big sized flake tools, scrapers, miniscule handaxes	Quartzite
Naganna chenu	Middle and Upper Palaeolithic	Blades, scrapers, microlithic debitage	Quartz, quartzite crest and chalcedony
Reddy Choultry	Middle Palaeolithic	Flakes, flake blades, debitage	Quartz and quartzite
Sarangadhara Matham	Middle and Upper Palaeolithic	Flakes, blades, scrapers, points and miniscule handaxes and cores	Quartzite
Telugu University Campus	Lower, Middle and Upper Palaeolithic	Handaxes, cleavers, picks, scrapers, big flake tools, blades and blade tools and cores	Quartz and quartzite
Vibhuti Matham	Middle Palaeolithic	Flakes, scrapers, cores and microlithic debitage	Quartzite, quartz, chalcedony crest
Polytechnic College	Lower and Middle Palaeolithic	Handaxe, .cleaver, flakes	—
Check Post	-do-	-do-	—

4. EXPLORATION IN DISTRICT MAHABUBNAGAR.—K. Thimma Reddy, D.R. Raju and N. Chandramouli of the School of History, Culture and Archaeology, Telugu University, Srisailam, noticed prehistoric assemblages at Chakali Sela, Chandragupta Pattanam (16°7' 40" N; 78° 53' 45" E) and Gurrapu Cheruvu villages in Achampet taluk. The implements, made of quartzite, chert and chalceony, collected from these villages, are of the Lower, Middle and Upper Palaeolithic periods.

The Department of Archaeology and Museums, Government of Andhra Pradesh, reported about thirty-five megalithic burials of various sizes scattered in an area of 18 acres (6.88 hectares) of land, to the south-west of a hillock near Vattem in Nagarkurnol Taluk.

5. EXPLORATION IN DISTRICT MEDAK.—The Department of Archaeology and Museums, Government of Andhra Pradesh, reported the presence of megalithic burial at Gonepalli in Chinnakoduru Mandal.

6. EXPLORATION IN DISTRICT NELLORE.—The Department of Archaeology and Museums, Government of Andhra Pradesh, reported the existence of fifty megalithic burials, mostly of cist-circle type, near the village Kallur in Doravari Satram Mandal.

Handaxes, scraper, borer, pointed flakes, cleavers, knives and retouched flakes, belonging to the Middle Stone Age, were found by the Department of Archaeology, Government of Andhra .Pradesh, from the slopes of a lateritic mound, near the village Kallur.

Early Stone Age tools, such as pebble tools, coup-de poing, cleavers and discoidal cores, were collected from the banks of the Kandleru near village Dakkili in Venkatagiri Taluk.

A site known as Kota Dibba was noticed on the western outskirts of the Duvvar village in Kovur Taluk. The finds include black-on-red and red wares, punch-marked and Satavahana coins and terracotta figurines.

7. EXPLORATION IN DISTRICT PRAKASAM.—The Department of Archaeology and Museums, Government of Andhra Pradesh, reported the discovery of palaeolithic implements from the terrace of the Cundlakamma river near Timmapalem village; nearly forty stone circles with cairn heap and a habitation site near the village Vaddipadu; six burials near Samadhulagutta in Addanki Mandala; thirty megalithic burials near the village Manikeswaram; and forty megalithic burials around the Chityala-guttalu hillock.

The village Vaddipadu yielded red polished and dull red wares and some broken pieces of querns. The rim portions show applique and incised designs.

8. EXCAVATION AT ELCHURU, DISTRICT PRAKASAM.—The School of History, Culture and Archaeology, Telugu University, Srisailam, under K. Thimma Reddy, M.L.K. Murthy, D.R. Raju and N. Chandramouli, conducted trial excavation and section scraping of a multi-culture site at Elchuru (16° 7' N; 79° 53' E) in Addanki Taluk. The site lies in the coastal Andhra Pradesh and is situated in the midst of granite hillocks of the Eastern Ghats.

The trial trench (3 X 3 m), taken in the middle of the mound, revealed habitational deposit of 4-2 metres. The stratigraphy of the site is as follows.

Layer	*Thickness*	*Colour & composition*	*Finds*
1.	23 to 42 cm, mean thickness 35 cm	Light brown, compact and hard	
2.	33 to 41 cm, mean thickness 37 cm	Dark brown; loose	
3.	84 to 100 cm, mean thickness 90 cm	Light brown; compact and hard	A thick deposit of ash
4.	46 to 57 cm, mean thickness 53 cm	Yellowish; compact, traces of charcoal	
5.	19 to 21 cm, mean thickness 20 cm	Compact, light yellowish and red silty sand	

Layer	*Thickness*	*Colour & composition*	*Finds*
6.	65 to 69 cm, mean thickness 67 cm	Compact, ashy-grey	
7.	65 to 76 cm, mean thickness 67 cm	Loose, dark brown	Floor having rammed earth and lime-plastered surface heap of bovine bones
8.		Compact, dark brown	Lime plastered floor. Adult male human (1-67 cm) tall burial. Heaps of granite and basalt blocks kept near the head and feet of the skeleton. Plan of circular hut, pieces of querns, hand-made pottery sherds, animal bones, probably of *Bos bubalus.* Pockets of ash and charcoal. Remains of iron furnace, having circumference of 150 cm, length 45 cm, and width 42 cm. The outer and inner diameter of hole is 16 cm and 11 cm respectively. The circular hole, exit for tuyeres measures 6 cm dia. The length from inner wall of the big hole to outer wall of the small hole is 25 cm. The furnace is supported by two small granite blocks, kept on the left outer margin.
9.	**80 cm**	Compact red earth	Blocks of stone and rubble, perhaps manuports

The antiquities included ground stone tools, grinders and rubbers, querns, mullers, sling balls, shell bangles, beads of steatite, carnelian and terracotta**,** terracotta figurines and two lead coins of the Satavahana period. A large number of animal bones, belonging to the species of cattle, sheep/goat, deer, gazelle, wild boar and rodents, were also found during the excavation. One adult male skeleton was recovered from a circular hut of the Neolithic period. Pottery, charcoal, grinding stones, mullers and animal bones were found placed by die side of the skeleton perhaps as a funerary object

The ceramic assemblage of the Neolithic period was mostly handmade and included the red ware (46-9%), black ware (25.8%), buff ware (18.9%), Mack and red ware (5.6%) and brown ware (11%). The main shapes were bowls, globular vessels, storage jars and miniature pots.

The ceramics of the historical period, mostly wheel turned, except storage jars, included red ware (35.8%), grey ware (20.2%), black ware (17.6%), brown ware (9.0%), buff ware (8.6%) and black and red ware (7.6%). The main shapes were bowls, globular vessels, dishes and storage jars. Some of the potsherds show the use of burnishing and beading techniques. A few of them have the wheel stamped over them, a characteristic very popular during the Satavahana period.

On the basis of pottery, stratigraphy and other antiquities the occupation at the site can be divided into two periods, Neolithic and early historical.

9. EXCAVATION AT THOTLAKONDA, DISTRICT VISHAKHAPATNAM.—In continuation of the previ ous year's work *(1987-88,* pp. 7-8), the Department of Archaeology and Museums, Government of Andhra Pradesh, resumed excavation at Thotlakonda to understand the structural pattern of the Mahastupa and the Vihara I and to expose the buried structures on the south-western and south eastern parts of the Mahastupa.

Viharas, apsidal and circular *chaitya-grihas,* stupas, votive stupa made of bricks, etc., were exposed. A rock-cut trough, oriented in east-west direction and elliptical in shape, with a flight of 7 steps in the southern side, was exposed while clearing the debris.

The antiquities recovered include full-blown lotuses with petals in stucco, fragmentary iron nails from the cells of vihara, a Satavahana coin, a Roman coin of Tiberius and potsherds of various types and shapes.

ARUNACHAL PRADESH

10. EXCAVATION AT NAKSAPARVAT, DISTRICT EAST KAMENG.—The Directorate of Research, Government of Arunachal Pradesh, under the direction of D.K. Bora, conducted excavation at Naksaparvat and brought to light the remains of a medieval settlement datable between the thirteenth and sixteenth century AD.

The excavation revealed the remains of four types of houses having rectangular plinth with cylindrical and square dressed stone pillars, over which rested, probably, a platform, perhaps similar to the one noticed in the modern tribal houses, the average height of the platform being approximately 1.30 metres; square structures with dressed stone slabs and stone blocks arranged systematically to a height of 1.20 m, perhaps serving as floor for some kind of superstructures; burnt brick square structure with M0 m high brick platform, and square houses having sun-dried brick and pebble flooring plastered with mud, and port holes at an interval of 1.75 m indicating the use of bamboo or wooden posts. The superstructures of the houses were perhaps made of perishable materials such as bamboo, *Toko* leaves and cane.

Ceramic industry is represented by red, brownish, glazed and celadon wares, the shapes being bowls, carinated vessels, conical lids, ritualistic pots and storage jars. Some of the pots have cord impression and stamped decoration.

The other finds included twenty stone sculptures belonging to Buddhist and Brahmanical pantheon, *dvarapalas* and *naga* figures, beads of green and bluish glass, iron smelting kiln and ring-wells.

ASSAM

11. EXCAVATION AT AMBARI, DISTRICT KAMRUP.—In continuation of the previous year's work *(1987-88,* pp. 8-9), T.C. Sharma of the Gauhati University, Guwahati and G.N. Bhuyan of the Department of Archaeology, Assam, conducted excavation at Ambari, with the assistance of Minerva Sonawal and Bhaskar Jyoti.

Due to the presence of very high sub-soil water excavations could not be carried out beyond the depth of 1-75 metres. Several structures belonging to the ninth-tenth century AD (Period I) were exposed. These consist of dwellings and boundary walls made of burnt bricks and a long drain made of stone blocks, perhaps taken from some pre-ninth century structures.

The antiquities unearthed in the excavation, included the sculptures of Surya (pl. IA), on a clay-stone slab inscribed with the word *mitra;* an unfinished granite image of Vishnu (pl. IB), perhaps locally made; sixteen-handed Mahishasuramardini (pl. IC), inscribed with the words *Chanda Nayika* in Kamarupi script of ninth-tenth century; a lattice of basalt, having lotus decoration, datable to pre-eighth century (pl. IIA); fragmentary terracotta figurines (pls. IIB and C); beads and bangles of terracotta; and beads of semiprecious stones like agate, carnelian, amber, coral and jade.

Grey ware, kaolin ware and a type of fine red ware were also recovered from the excavation. The common shapes were *lota* (pl. IID), bowl and dish.

The important antiquities of Period n, assignable to thirteenth-seventeenth century AD were dishes in glazed ware and bowls of Chinese celadon ware. Five copper and three nickel coins of the British period were found from the surface.

BIHAR

12. EXPLORATION IN DISTRICT BHAGALPUR.—Under the village-to-village survey programme, K.P. Choudhary of the Patna Circle of the Archaeological Survey of India found a late medieval temple dedicated to Radha and Krishna at village Jandana of the district.

13. EXCAVATION AT TARADIH (BODH GAYA), DISTRICT GAYA.—In continuation of the previous year's work *(1987-88,* pp. 9-10), Ajit Kumar Prasad of the Directorate of Archaeology, Government of Bihar, assisted by A.K. Verma, Kumar Anand, S. Jha, Amitabh Kumar, S.S. Singh, D.P. Gupta and S. Ranjan under the general guidance of Prakash Charan Prasad, resumed excavation at Taradih, with a view to ascertain the cultural sequence of the mound located to the north of the Mahabodhi temple at Bodh Gaya. The excavation revealed four cultural periods.

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[1]The Archaeological Survey of India is referred to in the following pages as the 'Survey'.

Period I was represented by deposits of the Northern Black Polished (hereafter NBP) Ware (Period IV of the Taradih mound). Remains of burnt-brick structure, having only two courses were exposed at the middle level of the period. A copper cast coin was found on the floor of this structure. The ceramic industry was represented by NBP and its associated wares. The common shapes were dishes with sharp carination at waist, vases having out-turned thickened rim and outcurved beaded rim, bowls with everted rim, bowls with horizontally splayed out rim, lipped bowls, basin with beaded rim, lipped basin, lid-cum-bowls, and bowls having thick flat base.

Important antiquities were beads, ear lobes, bangles, animal figurines, etc., all in terracotta; arrowhead (both socketed and tanged), points, styluses, etc., of bones; and antimony rods and cast coins of copper; nails and slag of iron; and stone beads.

Period II was represented by red ware of the Kushana period, of which the main types were sprinklers, *surahi,* frying pans with handles and flat-based bowls. For the first time, a burnt brick structure of the Kushana period was exposed at the site. The important antiquities were the terracotta stoppers, earlobes and beads, and stone beads.

Period III was marked by the appearance of Gupta and late Gupta remains comprising of rampart and burnt brick structures. The important finds comprised of terracotta beads, dabbers, gamesmen, bangles, balls, animal and human figurines, seals and sealings, and stone votive stupas, *chhatravalis,* pedestal, balls, etc.

Period IV was represented by antiquities and remains of the Pala period (Period VIII of Taradih). Ramains of brick-paved floor were exposed. Beads, dabbers, gamesmen, balls, animal figurines, seals and sealings all in terracotta; and votive stupas, *chhatravalis,* beads, etc., in stone were among the important antiquities recovered from this period.

14. EXCAVATION AT MANER, DISTRICT PATNA.—In continuation of the previous year's work, *(1987-88,* pp. 11-12), B. Narayan and A.K. Singh of the Department of Ancient Indian History and Archaeology, University of Patna, under the general guidance of B. Sahai, and with the assistance of J.P. Singh, R.N. Singh, and P.K. Bose, resumed excavation at Maner. The excavation revealed a 11-95 m thick habitational deposit, divisible into four cultural periods.

Period I was represented by a 345 m thick cultural deposit (layers 13 to 17) of the neolithic period. The red and grey wares, both of plain and burnished varieties and cream-and-red ware (represented by a solitary sherd) were the main ceramics of the period. Pottery of the lower level was mostly red ware and burnished red ware whereas the grey ware, both plain and burnished was more prominent during the later phase. During the middle level, both types of pottery was found in almost equal proportions. The common shapes included vase, long-necked vase, bowl, basin, *handi,* stand of bowl or dish with short stem, short-necked jar, lipped basin, vase with prominent flared rim, perforated bowl with applied solid circular base, large-sized incurved bowl, spouted bowl, some of which showing lutings, bowl with short spout, etc. The grey ware had shapes like vase, basin with spouted handle, bowl with short spout and perforated vessels. The vessels show perforation only in the rim portion, indicating its use for suspension. A number of sherds in both the variety of ceramics

which also included sherds having incised and punctured designs. The important finds (pl. HI) from this period included a number of microlithic tools like parallel-sided blades, points, crescents and fluted cores; pellets and pestles of stones; bone points; and terracotta spindle whorls.

Period II, with a 1.80 m thick deposit of the chalcolithic period, consisted of two layers of which the layer 12 was found to contain the remains of the preceding period as well of the chalcolithic period and Layer 11 represented the remains of only the chalcolithic period such as the wheelmade black-and-red, black and red wares, the main pottery types being stems of dish-on-stand, ring-based bowls, basins, small vase and small to medium-sized jars. Other noteworthy antiquities were the microlithic blades, waste flakes, cores, gamesmen and spindle whorls of terracotta and amulets and beads of stone.

Period in (from layer 10 to layer 5) was represented by a 3 m thick deposit of the NBP ware. The ceramics and other antiquities recovered from this period were the same as those noticed during the previous year's excavation.

Period IV began at the site after a break as indicated by a sterile layer (layer 4). A structural complex of the Pala period was exposed. The upper level of this period showed only mixed material which also included sherds of green glazed ware of medieval period.

15. EXPLORATION IN DISTRICT RANCHI.—Under the village to village survey programme, Sunil Kumar of the Patna Circle of the Survey found red ware sherds datable to the medieval period at the village Ekambe. He also noticed megalithic burials, a ruined brick palace and sculptures assignable to fifteenth-sixteenth century at the village Swtimbe in the district.

16. EXCAVATION AT JHIMJHIMIA-KALISTHAN, DISTRICT SAHBBGANJ.—In continuation of the previous year's work *(1987-88,* pp. 12-13), Ram Sekhar Singh, assisted by Satyendra Jha, R.P. Verma, D.P. Gupta, S. Ranjan of the Directorate of Archaeology, Government of Bihar, resumed excavation at Jhimjhimia-Kalisthan (Turtipur and Phoolbagh), situated at a distance of about 3 km south-west of Rajmahal, with the objective to know the nature and extent of black-and-red ware horizon in the region. The excavation revealed four-fold cultural sequence.

Period I was represented by black-and-red, red and black-slipped wares. They are mostly wheelturned and coarse in fabric, the main shapes being basins, bowls, etc. Among other antiquities terracotta beads, iron rings, etc., were important.

Period II was represented by the NBP, black-slipped, black, red and grey wares, the main shapes being vases, *handis,* bowls, dishes, basins besides a few perforated red ware sherds. The antiquities included beads of semi-precious stones and terracotta; bangles, pestles, tanged and socketed arrow-heads of bone and copper antimony rods. Burnt clay pieces with reed impressions were also collected from these levels.

Period III was Sunga-Kushana, the pottery consisted of the red, black-slipped, black and grey wares.

Period IV was represented by glazed ware in different shades like green, yellow, and bluish, and Chinese porcelain of the medieval period. The pottery types and shapes were wide-mouthed jar, cooking vessels having soot marks, basins, vases, *handis,* plates, bowl, lamps, tiles, etc.

17. EXCAVATION AT CHECHAR, DISTRICT VAISHALI.—B.K. Sharan, assisted by B. Nath, Sunil Kumar, K.C. Srivastava and K.P. Choudhary, of the Patna Circle of the Survey conducted excavation at Chechar, situated on the northern bank of the Ganga, to ascertain the cultural sequence of the site, which covers an area of approximately 500 square metres and is 7 metre high.

Period I yielded black-and-red ware, both coarse and fine variety, red-slipped ware, burnished black-and-red ware. Bone tools, arrowheads, points and copper pieces were the important antiquities of this period

Period II was marked by the occurrence of NBP Ware, punch-marked coins and a few terracottas,

Period in belonged to the late Kushana and Gupta periods. A burnt brick structure, perhaps the part of some residential complex, datable to the Kushana period was exposed. The brick, used in this period, measured 42 X 26 X 6 cm; 46 x 20 X 6 cm; 44 X 26 X 6 cm; and 42 X 28 X 5 cm. The important antiquities were beads made of terracotta, glass, ivory, crystal, agate, bone; pendants; armlets; bone objects like arrowheads, stylus, borer, pestles, dabber, etc.

18. EXCAVATION AT RAJA VISHAL-KA-GADH, DISTRICT VAISHALI.—B.K. Sharan, assisted by Lai Chand Singh and Saptarshi Kumar of the Patna Circle of the Survey, conducted excavation with a view to expose structures of different periods.

The excavation revealed the upper three strata to be disturbed due to brick robbing. The remains of a community well was found from the Kushana levels (pl. IV).

The antiquities recovered from the site included terracotta objects such as ball, beads, disc, ear studs, skin rubbers, seals and sealings having symbols and legend in Kushana and Gupta Brahmi characters and toy cart; iron rings; and objects made of copper, bone and ivory.

GOA

19. EXCAVATION AT OLD GOA, DISTRICT NORTH GOA.—S.K. Joshi, Ajit Kumar, J.D. Jadav, T.L. Deshpandey, D.T. Asar, V.R. Satbhai, R.D. Ingle and Chandrakant Ram of the Mini Circle, Goa, of the Survey, under the direction of A.K. Sharma, carried out excavation at Old Goa to expose the sixteenth century structure in the St Augustine Church complex.

The excavation brought to light the bell tower, the central nave (pl. V) and side chapels measuring 5 X 4 m (pl. VI), five on each side. From the stone paved floor of the main hall were found fifty-four inscriptional slabs covering the graves. The side wall of central nave was found to be decorated with painted Italian tiles. These exposed remains were conserved.

GUJARAT

20. EXPLORATION IN DISTRICT BHARUCH.—L.S. Rao and V.H. Parmar of the Excavation Branch V and Vilas Jadav of the Vododara Circle of the Survey, under the direction of R.S. Bisht explored the submersible area under Sardar Sarovar Project. Among these, the important were the microlithic sites at Gadher and Vadgam, along the northern bank of the Narmada river, which yielded blades, lunates, scrapers and points made on chalcedonic material; and late medieval temples at Surpan and Vadgam, of the district.

21. EXCAVATION AT SHIKARPUR, DISTRICT KUTCH.—In continuation of the previous year's work *(1987-88,* pp. 14-15), the Department of Archaeology, Government of Gujarat, continued the exca vation at Valamiyo Timbo mound, near Shikarpur village under Taluka Bhachau of the district The excavation was undertaken with an objective to understand the nature of the Harappan habitation.

This season's excavation revealed a portion of a 9.30 m thick portection (?) wall like structure made of mud bricks set in mud mortar, probably going around the entire mound. The bricks used in this wall, were 40 X 20 X10 cm in size. The mud bricks were of yellowish-brown, reddish-brown and ashy-black colours. The other exposed structures comprised houses, made of rubble and mud bricks set in mud mortar. One silo was found filled with ash bones and potsherds.

The ceramic industry was represented by red, chocolate, buff, coarse-red, coarse gritty, perforated cream-slipped, Black-and-red, Reserved-slip, glazed and polychrome wares. Most of the pots had painted designs. The main shapes included dish-on-stand, dish, bowl, basin, globular pot, big and small sized jars, vase, beaker, trough and miniature pots. Few sherds of ribbed ware were also noticed. A new type of a deluxe red ware, well fired and having fine polished surface was also found. Rim based, flat shallow pan with beaked rim in plain red ware, found from this site, appears to be a rare type.

Important antiquities found from the site included micro beads, disc beads and wafer beads, all in steatite; conchshell objects such as, bangles and slice; terracotta objects like toy-cart frame, wheels, bangles, triangular cakes, bull figurines and semi-triangular and flat pot finisher with sharpened edge on longer side; bone objects, such as pecker points and trimmer; micro gold beads; drill-bits made of various stones like carnelian, etc., pestles having semi-lenticular section; and querns and chert blades. At one place, triangular terracotta cake was found to be placed by the side of a hearth, perhaps indicating its use in cooking for controlling or maintaining certain degree of heat

22. EXCAVATION AT SIYOT, DISTRICT KUTCH.—The Department of Archaeology, Government of Gujarat, conducted excavation at the cave near village Siyot in Taluk Lakhpat. The important finds of this season's work were clay sealings, engraved with Buddha images in different *mudras,* some having inscription in late Brahmi and Devanagari characters; Gadhaiya coin, copper rings, terracotta Nandi with bell and chain and different types of earthen wares like *surahi, etc.* On the basis of the stratigraphic evidence it appears that the cave was occupied by the Buddhists prior to the establish ment of the Saivas who occupied the site around twelfth-thirteenth century AD.

23. EXCAVATION AT UMTA, DISTRICT MAHESANA.—In continuation of the previous year's work *(1987-88,* pp. 17), the Department of Archaeology, Government of Gujarat, conducted excavations at the Rajgadhi mound near village Umta in Taluka Visnagar of the district.

The excavation revealed the structural remains of a temple, made of stone and marble, a few brick walls, and a. bastion made of bricks.

24. EXCAVATION AT KUNTASI, DISTRICT RAJKOT.—In continuation of the previous year's work *(1987-88,* pp. 17-19), the Department of Archaeology, Government of Gujarat, and the Deccan College, Pune, carried out excavation of Bibi-ai-no Timbo mound near the village Kuntasi in taluk Malia. Remains of a Harappan trading-cum port-complex were unearthed apart from the remains of a jetty-platform, warehouses and an industrial complex. Remains of a twin wall encircling the site were also noticed. Among small finds were the beads made of steatite, agate, carnelian and lapis lazuli. On the basis of the artefacts, the settlement could be dated between *circa* 2200-1700 BC.

25. EXPLORATION IN DISTRICT SURAT.—Vilas Jadhav of the Vadodara Circle of the Survey, under the village-to-village survey programme, brought to light the following sites of acrhaeological interest.

Taluk	*Site/Village*	*Nature of remains*
Songad	Chimkuva	Late medieval image of Hanuman
-do-	Darakvan	Early medieval habitation site and figure of Ganesha
-fo-	Devalpada	Late medieval hero-stone
-do-	Dron	Seventeenth century Hanuman figure
-do-	Gopalpura	Microliths
-do-	Hanumantiya	Late medieval hero-stone
-do-	Hindala	Eighteenth century dam
-do-	Jamkhadi	Microliths
-do-	Kati	Microliths
-do-	Khadi	Late medieval hero-stone
-do-	Kharasi	Temple and remains of sixteenth century
-do-	Kikakvi	Microliths
-do-	Kuvradi	Late medieval hero-stone
-do-	Lakhali	Late medieval hero-stone
-do-	Mahudi	Microliths
-do-	Medha	Palaeoliths
-do-	Mogawan	Microliths
-do-	Tokarava	Late medieval hero-stone
-do-	Tichakiya	Late medieval hero-stone

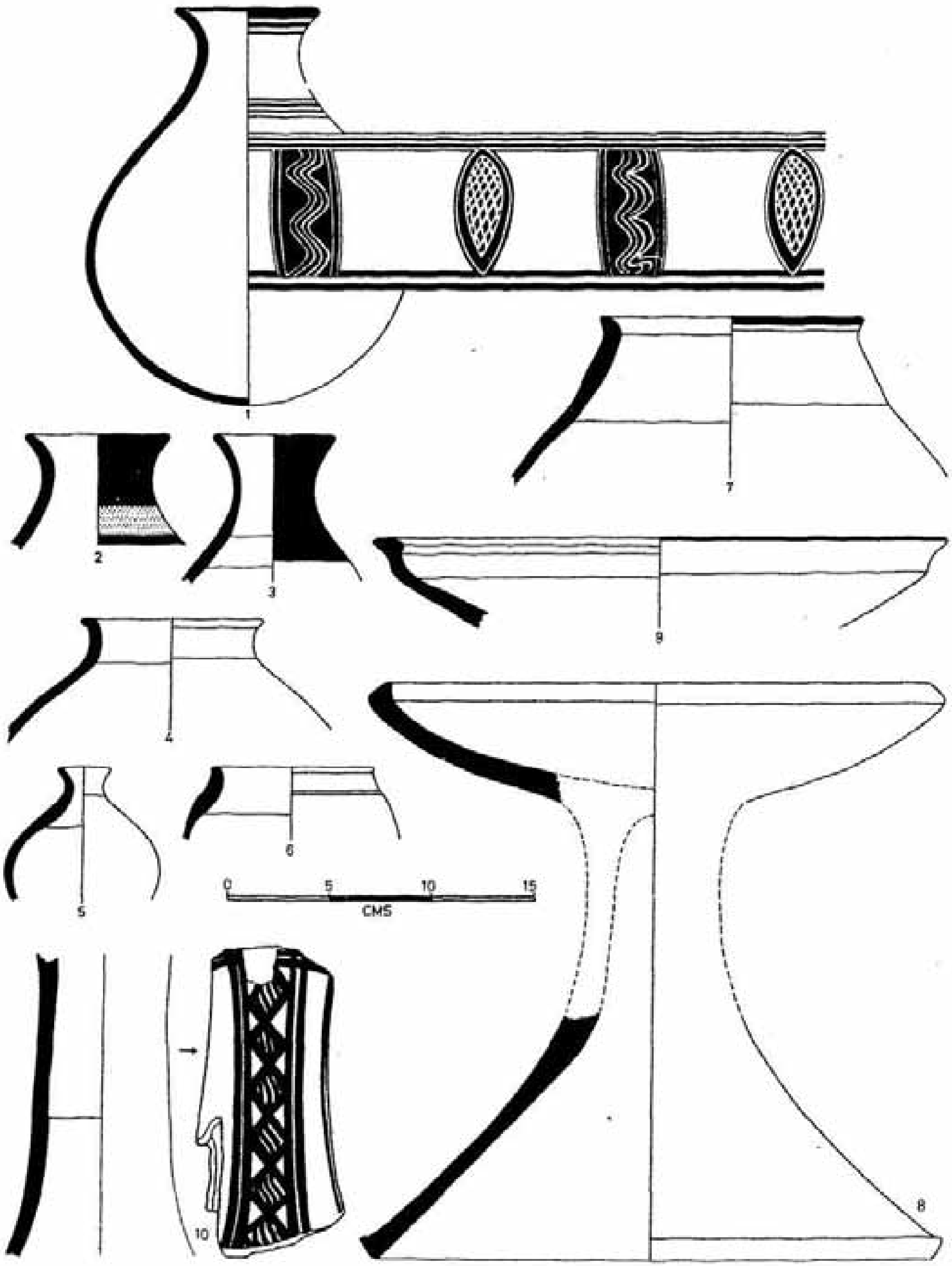


FIG. 1. *Nagwada : Pre-Harappan pottery*

Taluk	*Site/Village*	*Nature of remains*
Ucchal	Ful-umbran	Temple remains of fourteenth century
-do-	Karod	Eighteenth century inscription in Gujarati
-do-	Kuida	Sculpture datable to eighteenth century
-do-	Sevati	Palaeoliths, microliths and eighteenth century temple ruins
-do-	Tavali	Palaeoliths

26. EXPLORATION IN DISTRICTS SURAT AND VALSAD.—The Department of Archaeology, Government of Gujarat, reported the discovery of microlithic sites at villages Bartad, Dharampur, Kalamha, Khambhuliya and Sara in Taluk Vansada of the District Valsad, and Barkachha, Chunawadi, Padamdungari, Pathakwadi and Umaradpur in Taluk Vyara of the District Surat.

27. EXCAVATION AT NAGWADA, DISTRICT SURENDRANAGAR.—In continuation of the previous year's work *(1987-88,* pp. 19-20), K.T.M. Hegde, assisted by V.H. Sonawane, V.S. Parekh and Ajith Prasad, of the Department of Archaeology and Ancient History, M.S. University, Baroda, resumed excavation at Nagwada (23° 20 N; 71° 41° E) in Taluka Dasada, with the objectives of (i) tracing the habitational deposit of the pre-Harappan peasant community, (ii) unearthing complete plan of houses in each structural phase of the mature Harappan period, (Hi) locating workshops of semi precious stone ornamental bead and shell bangle manufacturing industries, and (iv) opening more areas of the ancient settlement.

The nine trenches taken up this year yielded only pre-Harappan potsherds (fig. 1) without revealing any clear habitation deposit The excavation brought to light the complete plans (fig. 2) of a number of structures belonging to the structural phases III and IV. The remains of rubble structures of the second phase were found to be too disturbed to reveal any clear plan or orientation. The remains of a number of mud brick structures, of the third and fourth period were comparatively in a better condition, thus giving an idea of the plan and the orientation. These structures measured 6.6 X 5.10 m externally and consisted of 50 cm thick mud-brick walls, having an extant height of three courses of bricks. The structures were oriented in the north-south direction, with a partition wall along its length dividing the structure into a large room to the west side and probably an open verandah to the east.

The structures of the fourth phase were made of rubbles set in clay mortar. One of these exposed structures was found to be rectangular in plan (6.6 X 4.4 m), and oriented in the east-west direction. The walls were 60 cm thick. The objects recovered from the floor of this house included a large pot-stand, a few intact pots, querns, mullers, part of a gold ornament and a spherical shell object decorated with concentric rings, made from a columella of Turbinella pyrum shell. Similar shell objects were also reported from Mohenjo-daro. Spherical accuracy and arrangements of six sets of concentric circle decoration on the shell objects is a noteworthy feature.

SUCCESSIVE STRUCTURAL PHASES OF
THE MATURE HARAPPAN PERIOD AT NAGWADA

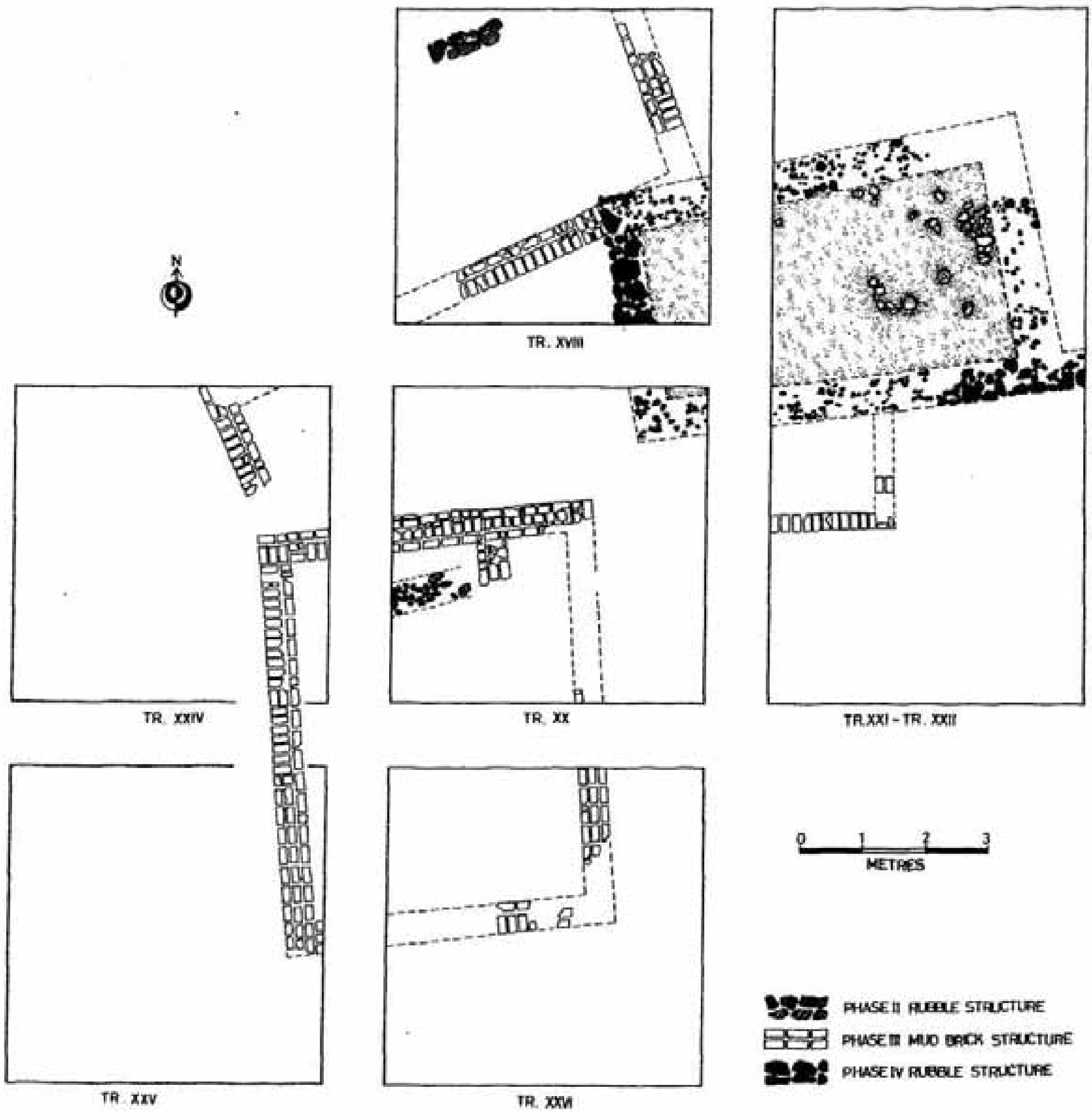


FIG. 2

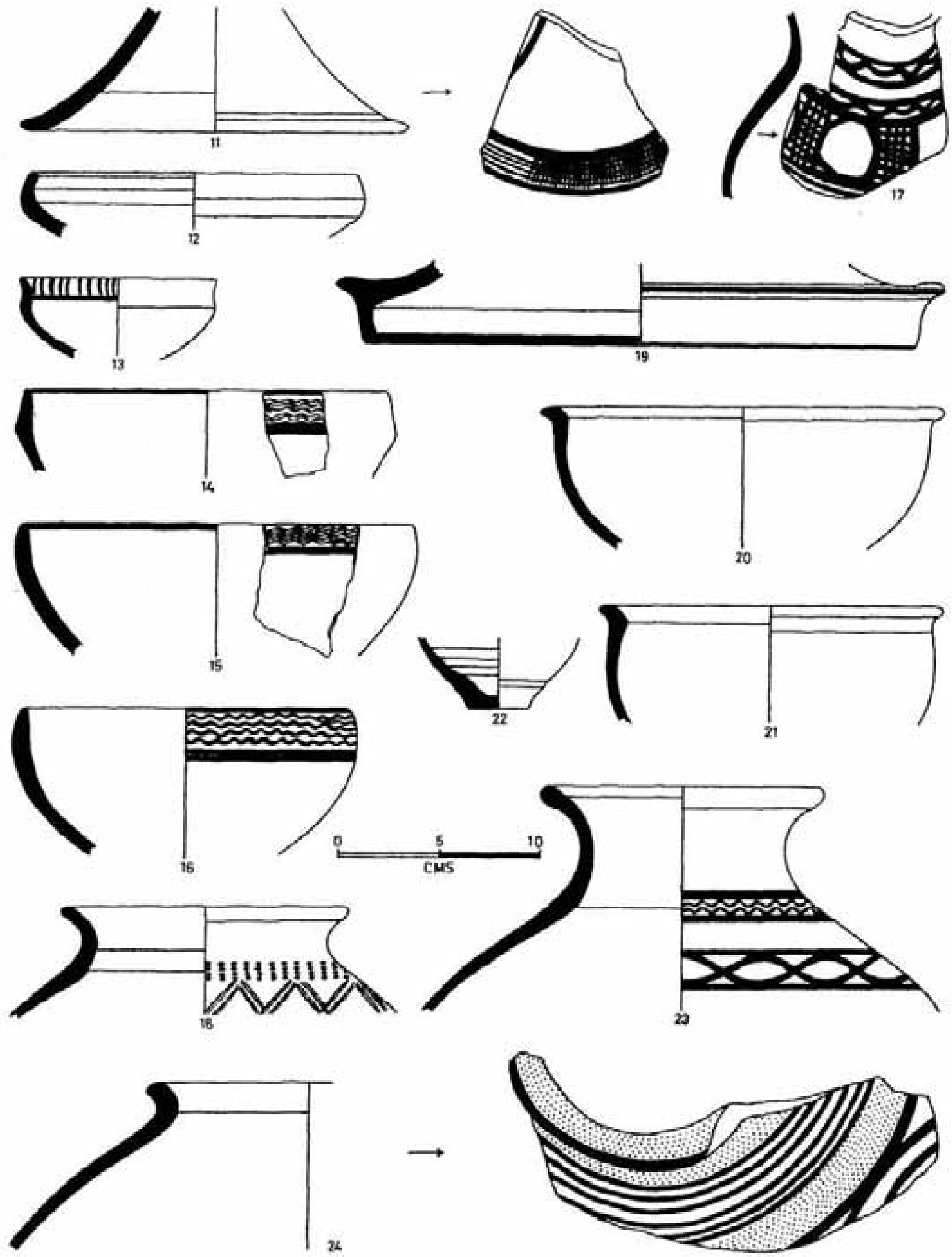


FIG. 3. *Nagwada: Pottery*

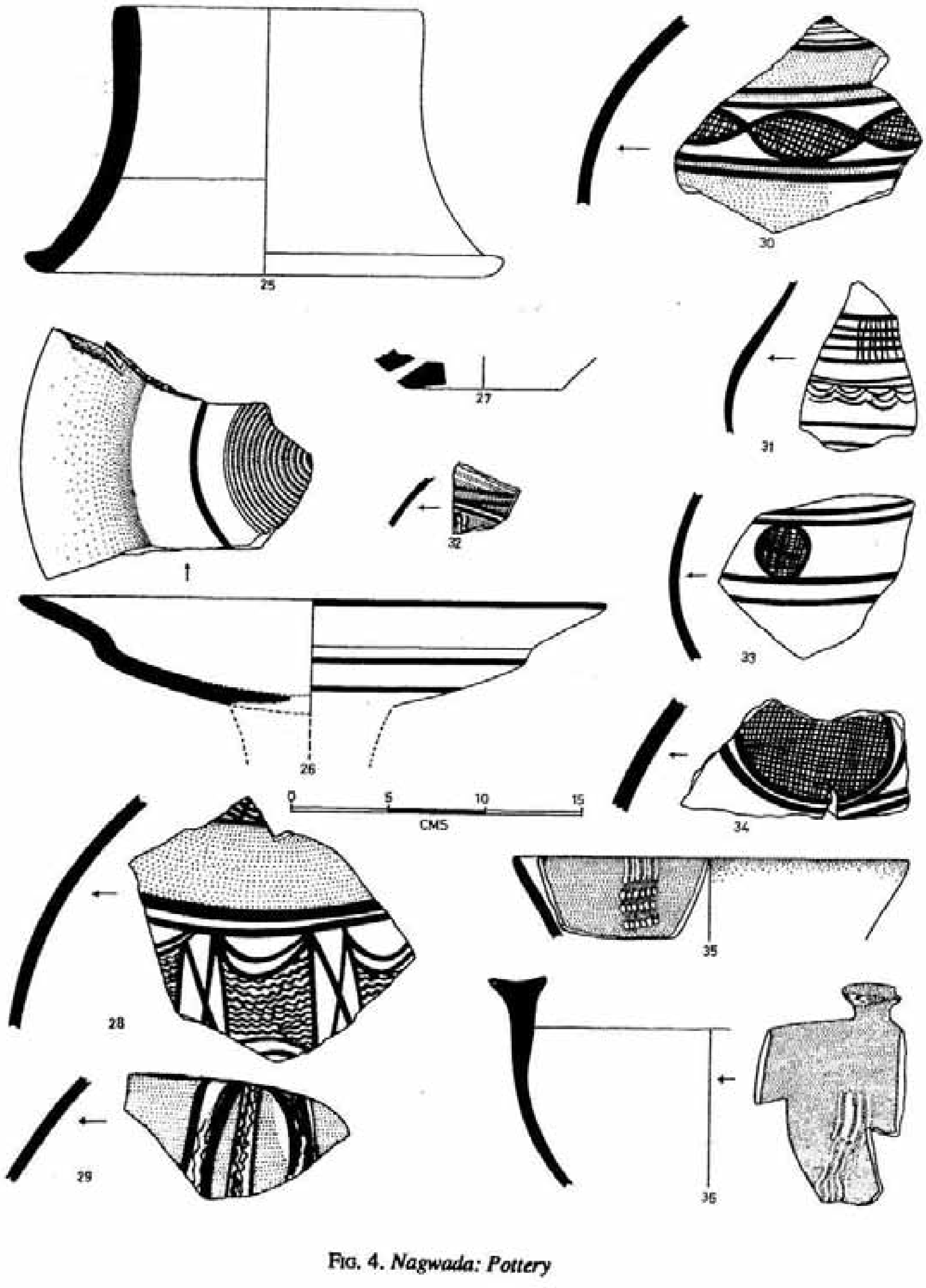


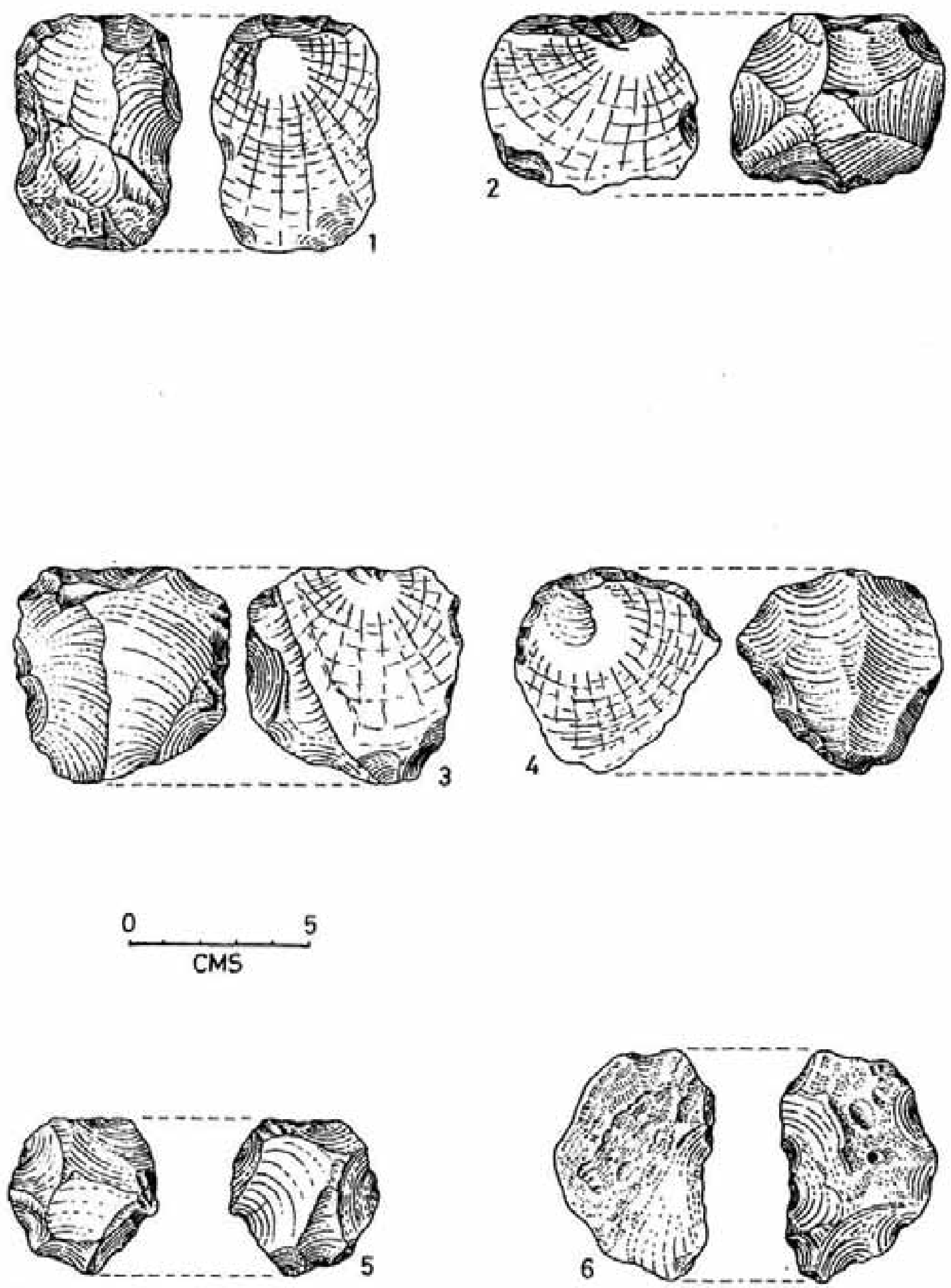
FIG. 4. *Nagwada: Pottery*

The other important objects included three cubicle agate weights, measuring 0.964 gm, 1.925 gm and 54.43 gm respectively. Among the ceramics mention may be made of Harappan red ware, buff ware and chocolate-slipped ware (figs. 3-4). The dominant ware of the period was the coarse gritty ware in red fabric, represented by dish-on-stand, perforated ware and jars. There were also plain and white-painted Black-and-red ware bowls, some of them having short stud-handle, among the ceramic collection.

Stone objects, recovered from this season's excavation, included long ivory coloured flint blades; beads of agate, lapis lazuli and steatite. Some of the agate beads showed different stages of manufacture. They, together with chert micro drill-bits found at the site, indicated the existence of agate bead making industry. A number of shell bangle fragments along with the manufacturing waste were also found from the site, but the site representing industry to make these bangle could not be ascertained this season.

28. Exploration in the Orsang Valley, District Vadodara.—In continuation of previous year's work *(1987-88,* pp. 31-32), Ajith Prasad of the Department of Archaeology and Ancient History, M.S. University, Baroda, under the guidance of K.T.M. Hegde, carried out exploration in the area between Sankheda (21° 10' N; 73° 35' E) and Bodeli (21° 16' N; 73° 43' E) of the Orsang Valley. The sites and their cultural assemblage are as follows:

Village/Site	*Locality*	*Nature of remains*
Achali (22° 19 N; 73° 37 E)	I, II, III	Primary Acheulian and Mesolithic
Baskario (22° 18' N; 73° 40' E)	I, IIIa	Primary Acheulian, Middle Palaeo-lithic (Transition phase)
Bhagwanpura (22° 16' N; 73° 35' E)		Mesolithic
Don Dunker (22° 19' N; 73° 42' E)	I, II	Primary Acheulian
Duma (22° 18' N; 73° 41' E)	Ia	Acheulian and Middle Palaeolithic (Transition phase)
Gunded (22° 9' N; 73° 35' E)		Mesolithic
Gundiviri (22° 16' N; 73° 38' E)	I, II & in	Primary Acheulian
Gundiviri (22° 2C N; 73° 39' E)		Mesolithic
Haveli (22° 18' N; 73° 39' E) Kolwa	I, II	Primary Acheulian
(22° 16'-N; 73° 39' E) Laphni (22°	I	Primary Acheulian
19' N; 73° 41' E) Lever(22° 16' N;		Mesolithic
73° 38' E) Mosabar (22° 13' N; 73°		Mesolithic
16' E) Pipiya (22° 19' N; 73° 43' E)	II	Primary Acheulian
	I to IV and V	Primary Acheulian and Middle
Rajpari (22° 19' N; 73° 38' E)		Palaeolithic (Transition phase)
		Mesolithic



1 Notched Scraper; 2 End Scrapers; 3,4,6 Side Scraper
5 Core (Levallois Type) (6 From the Section at Samdhi)

FIG. 5. *Samdhi: Early Middle Palaeolithic tools*

Village/Site	*Locality*	*Nature of remains*
Ratanpur (22° 17' N; 73° 37' E)		Secondary Acheulian (River gravel deposit), and Middle Palaeolithic (Transition phase)
Sagdhra (22° 18' N; 73° 37' E)	II to IV and I	Primary Acheulian Middle Palaeo-lithic
Samdhi (22° 13' N; 73° 36' E)		Secondary Acheulian (River gravel deposit), and Middle Palaeolithic
Samdhi (22° 16' N; 73° 39' E)		Mesolithic
Uchhet (22° 18' N; 73° 39' E)	I, Ha & IIIa	Middle Palaeolithic and Acheulian
Uchhet (22° 18' N; 73° 39' E)	III	Primary Acheulian

The primary localities of the Acheulian period were found to be distributed at the piedmont of the northern escarpment of the valley either close to the foot of rocky ridges or along the course of small tributary streams. The artefacts included a number of waste flakes, large number of quartzite blocks and cores, unfinished and broken bifaces alongwith well finished implements. These artefacts were made of locally available quartzite and occasionally of fine quartz. Handaxe was the most prominent tool type followed by scrapers and cleavers. Other types were picks, knives, polyhedrons, chopping tools, etc.

Stratigraphic and typo-technological evidence indicated that the Acheulian culture of the valley developed into the Middle Palaeolithic culture which represented a transition phase between the Upper Acheulian and Middle Palaeolithic periods. The main tool types of this period were miniature handaxes, variety of small scrapers, made of Levallios flakes, points and retouched flakes (figs. 5-6). Fine grained quartzite was used as the raw material for artefacts of this period. These artefacts occurred in the thin upper gravel of the alluvial deposit exposed in the piedmont region at Ratanpur and Samdhi.

Mesolithic sites are generally associated with three geomorphic contexts, (a) in the piedmont of the northern escarpment, particularly at the top of stablized sand dunes, (b) in the Orsang-Unch alluvial plain, and (c) at the top and shoulder of rocky ridges. Agate and chalcedony were the main raw materials for the artefacts of this period, though artefacts of chert and fine quartz were also met with. The tool assemblages included lunates, triangles, trapezes, a variety of backed blades, burins, borers, points, and a number of scrapers in association with different types of cores, nodules, a number of hammer stones, broken pieces of ring stones/mace heads, anvils and thin sandstone pallets.

HARYANA

29. EXPLORATION IN DISTRICT KARNAL.—Kanwar Singh of the Chandigarh Circle of the Survey, under the village-to-village survey programme, brought to light the following sites of archaeological interest.

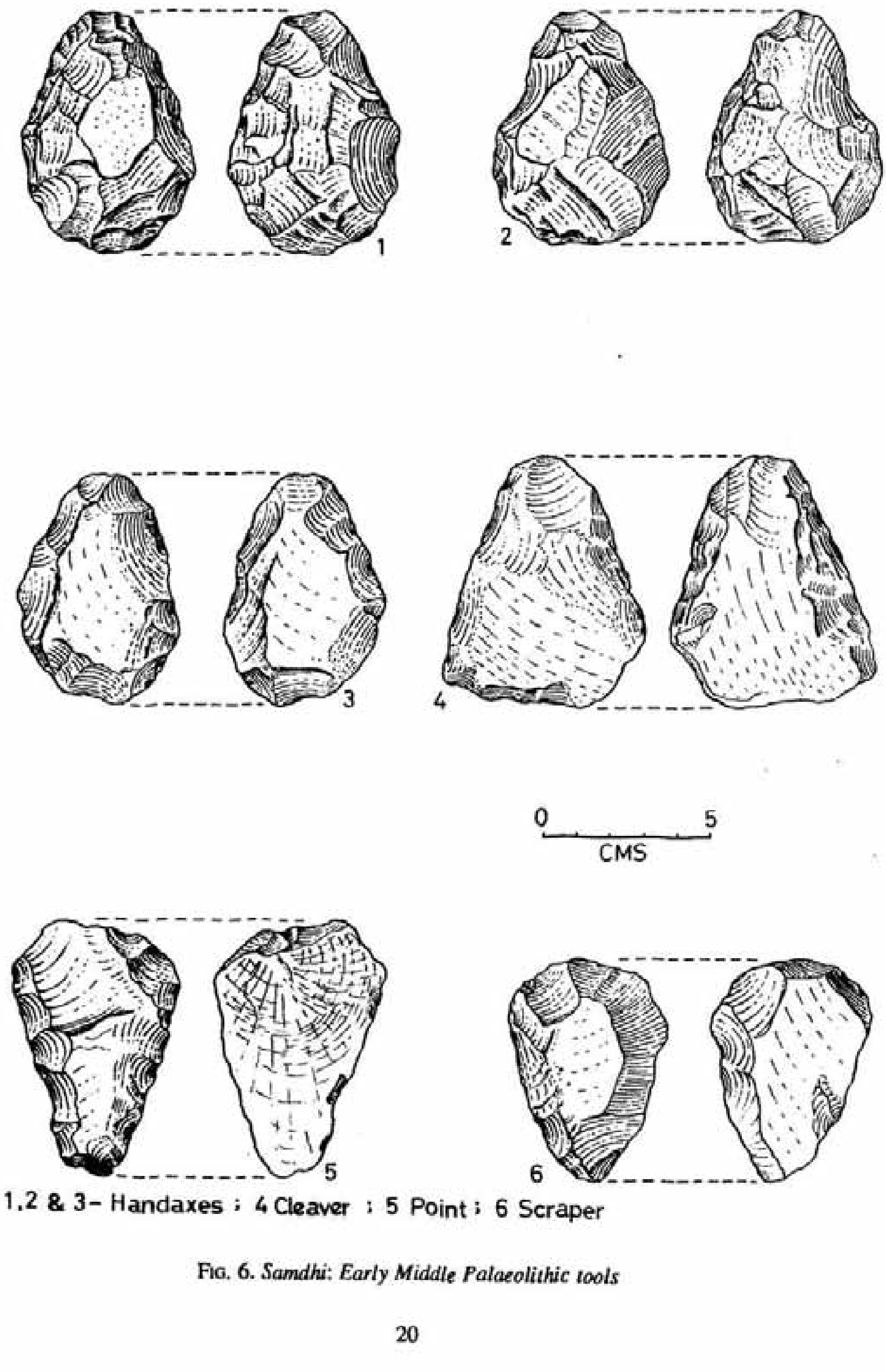


FIG. 6. *Samdhi: Early Middle Palaeolithic tools*

Tehsil	*Village/Site*	*Nature of remains*
Panipat	Ahar	Mounds
-do-	Bapauli	Siva temple
-do-	Dumyana	Medieval pottery and silver coin
-do-	Jondhan Kalan	Bathing *ghat*
-do-	Karad	Red ware
-do-	Kurana	Temple
-do-	Narah	Temple complex, well and bathing *ghat*
-do-	Pardhana	Medieval site
-do-	Palhri	Mound
-do-	Sherah	Old palatial building
-do-	Shohdapur	Tomb
-do-	Sink	Ancient tank and sculpture

30. EXCAVATIONS AT HARSH-KA-TILA, THANESAR, DISTRICT KURUKSHETRA.—The Institute of Archaeology of the Survey continued *(1987-88,* pp. 28-31) the excavation at Harsh-ka-Tila, under the direction of B.M. Pande, assisted by R.P. Sharma of the Institute of Archaeology, J.M. Thapar of the Aurangabad Circle, G.S. Gaur of the Excavation Branch II, K.C. Nauriyal, H.S. Miyan, R. Dalai of the Headquarters Office, A.K. Patel, B.S. Jamwal of the Srinagar Circle and D.N. Dimri of the Jaipur Circle of the Survey. The main objective of this season's work was (a) to know more about the lay-out of the house-complexes and material remains of the period, (b) to expose further the partially-exposed palatial-complex, (c) to establish the interrelationship of different habitational periods with different phases of fortification, and (d) to understand the relationship between the settlement at Harsh-ka-Tila and the Bahari mound.

This season's excavation have more or less confirmed last year's cultural sequence which ranges from the Kushana to the Late Mughal period. The findings of the few sherds of Painted Grey Ware during the last season's dig could not be confirmed this year due to the superimposed structures and deposits of the successive periods.

Apart from continuing excavation in last year's trenches and extending work in the contiguous areas, the rain-gully on the southern slopes of the mound (pl. VII) was also subjected to excavation. This deep and wide L-shaped rain-gully had exposed sections showing structures and habitational deposits. Apart from exposing the structures and habitational deposits of different periods the excavation of rain-gully also revealed the presence of a considerably wide and high mud rampart belonging, in all likelihood, to the Kushana times, thus representing the earliest defence work at the site. The remains of successive defence walls, built during the later periods, encircling the entire settlement right up to the Mughal times, were also noticed in this area. Another structure from this area was a burnt brick platform, measuring 1.80 X 1.57 X 0.75 m with the brick size of 39 X 22 X 6 cm. Only eleven courses of bricks, belonging to this structure, were exposed during this season.

Kushana period {*circa* first to the third century AD), the earliest settlement of the area, was represented by red ware comprising bowls having incurved rims, corrugated tapering profile and narrow flat base, sprinklers, carinated *handis,* miniature vases, lids, spouted vessels, lamps, etc. Some pots either having stamped decoration or painted designs were also found. Important antiquities included terracotta human and animal figurines, flesh rubbers, ear-studs, beads of terracotta and semiprecious stones and bangles of ivory and shell. Noteworthy terracotta objects consisted of a lid with triangular perforations and a figure of couchant lion (pl. VIIIA), an elephant (pl. VIIIB) and a ram with perforated eyes (pl. VIIIC), two anthropomorphic figurines (pl. KA), one of which is violin-shaped with pinched face while the lower half portion of the other figure was found to be damaged and some plaques with male and female figures. One of the plaques had the figure of one male and two females in amorous posture (pl. KB). A few copper coins and a copper crucible were also recovered from this period.

The Gupta period (*circa* fourth to the middle of the sixth century) was marked by brick-built houses and red polished, bright red-slipped, plain red and moulded wares. The main shapes included footed bowls, sprinklers and moulded bowls besides other pottery shapes of day-to-day use. The important antiquities included terracotta and semiprecious stone beads, terracotta animal figurines bearing red polish, foot portion of terracotta human figure bearing red slip and showing fine modelling, and terracotta sealing depicting a floral design.

The next period of occupation at Thanesar has been identified as the Vardhana period (middle of the sixth century to the end of the seventh century). It was distinguished by a red ware, represented mainly by medium-sized bowls with flat base found in large numbers on the western slopes of the mound. There was an increased use of red ware in which black colour was applied on red slip before firing the pots. The other pottery shapes were lids with cup-like depression, spouted vases and sharply carinated *handis;* decorated pottery was rare.

The important finds from this period comprise a fragmentary human head, vaguely recalling the figure depicted on the coins of Harsha, and three identical coins of gold alloy bearing inscription in Brahmi, possibly of Indo-Sassanian times. Other antiquities included terracotta animal figurines, beads of terracotta and semiprecious stones, ivory and shell bangles.

The building-complex with a wall of 99 courses of bricks, partly exposed last year, was further traced on the northern and the western sides (pl. X).

The Rajput period (*circa* eighth to twelfth century) was represented by a thin-sectioned red ware of medium fabric, generally bearing stamped decoration which include concentric circles, floral motif and mat-like impressions. The characteristic shapes included knife-edged bowls, spouted vases, lid and jars. A few sherds of plain glazed ware were also noticed in the late levels of this period.

Noteworthy finds of this period were the clay tablets of which more than six hundred were found. Save for some exceptions, all these tablets bear, three incised horizontal, vertical, oblique or curvilinear lines. These were found in association with some terracotta ritual objects comprising a ladle, incense burner and a lamp and a square terracotta object, both containing inscription in the Nagari of area ninth-tenth century. Quite a few stone architectural and sculptural fragments (pl. XI),

were also met with. Important sculptures included those of Sarasvati, Ganesa, a female deity in the posture of feeding a child on her lap, and a male figure with moustaches and beard (pl. VIIID). On stylistic considerations, these stone sculptures may be ascribed to the Pratihara period although these have also found in deposits of later periods. Among the other antiquities were terracotta human and animal figurines, stone pestles, various household and other miscellaneous objects of iron and copper, beads of terracotta and semiprecious stones, bangles of shell, ivory and bone. Many terracotta seals and sealings were found, one of which had a lion figure and another the depiction of a cross formed with nail marks. Some of the sealings were inscribed in Nagari characters, which have been tentatively read as *Go, Pura, ga-ra-a,* and *grama.* One marble piece had the "ncribed letters on both the faces, which read as *sing ha* and *patraha.*

The Sultanate period {*circa* thirteenth century to first quarter of the sixteenth century) was marked by red and glazed wares, the latter variety having two types—white with sandy friable texture and normal pottery fabric of red medium core with crackled glazed surface having paintings. Important shapes in the glazed surface include shallow and deep dishes and small-sized vases. The shapes in red ware include a variety of jars, plate, bottle-necked *surahi,* bowls of various sizes and big basins. Among the antiquities were terracotta animal figurines, beads, ear-studs, iron objects of daily use and bone and shell objects.

The exposed structures of this period were the walls of residential buildings, made up of brickbats and re-used bricks. So far, two structural phases have been noticed.

The Mughal period (second quarter of the sixteenth century to the mid-nineteenth century) was represented by red wares. Some sherds of Chinese porcelain depicting floral designs were also found. Important shapes include shallow dishes, bowls, *surahis, chilams, huqqas,* buttoned lids, jars, etc. Among the important antiquities of this period were terracotta animal and human figurines. Of the animal figurines, the bull, having applique and incised decoration, and among the human figurines, the figure having either elongated or conical cap, were very interesting. Other antiquities included several copper coins, bearing legend in Persian, rings of gold and silver, beads of terracotta and semiprecious stones and objects of daily use such as utensils of iron, copper, stone grinder and pestles.

Four phases of constructional actvities in TSR-1 and three phases in TSR-3 were noticed. A large house-complex consisting of big walls of reused *lakhauri* bricks laid in mud mortar was exposed. Deep and large foundation were noticed in an exposed house-complex in TSR-3. In some of the house in TSR-1 were found large and small arched niches. The houses comprised of rooms of various sizes, .some of which were paved with *lakhauri* or re-used brickbats. In some rooms were found mud floors, *chulhas* of various sizes, pestles and grinders. In the rain-gully, on the southern portion of the mound, was found a *lakhauri* brick-on-edge paved ramp connecting a house to a small street.

This season's work revealed more details about defences (pl. XIIA), which may have enclosed the ancient habitational settlement from the beginning of the Christian era to the end of the Mughal period. Unlike the mud-rampart of the southern side of the mound, the northern side, more particu-

larly the north-western end, revealed the evidence of a few burnt-brick structures representing the evidence of defence walls. Perhaps, the baked brick was used on the north side to secure a relatively more vulnerable flank of the settlement.

On the northern side of the mound, one of the walls built during the Kushana period, and oriented north-west, was exposed to a length of 3.40 m, with minimum height of twelve courses, laid in the "English bond" set in mud mortar. The brick sizes, used in this construction, were 37 X 23 X 6 cm and 36 X 22 X 7 cm. On the south, the earliest wall enclosing the settlement during the Kushana period, was a mud rampart exposed in the rain-gully; 15 metre in width, this mud rampart was traced to a length of 20 m. The rampart was composed of yellowish clay mixed with *kankar.* The defence wall of the Gupta period appears to have been laid, on the south side, right over the mud rampart of the preceding period in almost the same alignment. The wall of this was made up of brickbats and found to be preserved upto a height, of fifteen courses only. It could be exposed to a length of 3-30 m only; further westwards, it had been heavily eroded by the rain-gully. The bricks used in the construction are of mixed size e.g., 39 X 27 X 7 cm, 35 X 22 X 6.5 cm, 32 X 20 X 7 cm, etc.

The fortification of the Vardhana period was best understood in TSR-2 where 9 m long, north-south oriented, run of the defence wall was laid bare along the western fringes of the mound (pl. XIIB). In the rain-gully area, it was exposed to a length of 5.25 m; the extant height of the wall, raised in offset, was found to be of twelve courses. The bricks used in the construction of defences of this period were of the size of 23 X 19 X 6 cm, although aberrant sizes and re-used bricks were also met with.

The defence walls of Rajput period followed one of the preceding periods. Evidence however has it that the period represents at least two constructional phases of which the earlier perhaps came into existence around the beginning and the later sometime in the middle of the period. The bricks used in the walls of this period were 31 X 21 X 7 cm, and 32 X 21 X 6 cm in size. Evidence in TSR-1 showed that the second constructional phase may have resulted out of the need of major renovation work in the wake of perhaps some destruction.

Rigorous structural activities further seem to have been carried out in the Sultanate period. The defence wall, of the period mark the use of rubble, which originally belonged to earlier Hindu temples and shrines. Various types of architectural members and mutilated sculptural pieces of Brahmanical deities were found placed in the defence walls built during this period. The 3.80 m long defence wall of this period exposed in the rain-gully area was found to be having only ten brick courses. In TSR-I, on the north-western corner of the mound, the semi-circular bastion was further exposed which seems to have also served purpose of the watch-tower as well.

During the Mughal period, the defence wall was repaired from time to time, as could be noticed from the evidence of repairs and buttress walls. Besides, re-used bricks, *lakhauri* bricks of both larger and smaller size were used in the making of the defence walls. Construction of some post-Mughal structures, atop the fortification wall of this period are indicative of the defence falling into disuse.

HIMACHAL PRADESH

31. EXPLORATION IN DISTRICT MANDI.—Under the village-to-village survey scheme, Teeka Ram Sharma of the Chandigarh Circle of the Survey explored following sites:

Tehsil	*Village/Site*	*Nature of remains*
Karsog	Beludhar	Temple
-do--d	Choa	Sculpture
o--do-	Ghabrela	Temple
-do--d	Ghariyana	Siva shrine
o--do-	Kaletha	Image of Durga
-do--d	Khandarla	Temple
o--do-	Kurana	Temple
-do--d	Lohardi	Temple
o--do-	Nanj	Siva Temple
-do--d	Pagula Bhawa	Temple
o--do-	Purana	Siva Temple
-do--d	Saranda	Serinag Temple
o-	Shagatra	Temple
	Shahore	Temple
	Sharli	Stone-Sculpture
	Sharol	Sculpture
	Teadal	Sculpture
	Valudhak	Temple

32. EXPLORATION IN DISTRICT SIRMAUR.—The reconnaissance survey conducted by O.C. Handa, of the Department of Language and Culture, Government of Himachal Pradesh, Shimla, resulted in the discovery of a Kushana site at village Mirpur-Kotla in Tehsil Nahan and two temples at village Mangarh in Tehsil Pachhad of the district.

The objects from Mirpur-Kotla included stone sculptures, representing Trimurti, Surya, *yogini, vidyadhara,* unidentified seated deity and a head of Vishnu; and bricks measuring 27.5 *X* 20 X 5 cm. The village also has a Gurudwara, in the premises of which is a well, the inscriptional slab of which gives date of its excavation as Vikrama Samvat 1880 (AD 1823).

Lalman of the Department of Ancient Indian History, Culture and Archaeology, Punjab University, Chandigarh, explored the following sites of archaeological interest:

Taluk	*Village/Site*	*Nature of remains*
Puchhad do-	Mangarh	Siva temple datable to post-Gupta period
-do-	Narag	Late medieval fragmentary sculptures
Ponta Sahib	Amboya	Medieval sculptures of Karttikeya, Ganesa, Varaha, crocodile, bhadramukha and architectural members
-do-	Bias	Medieval sculptures of Nandi, Ganesa and Durga and architectural members
-do-	Danda	Medieval sculptures of Ganesa, *bhadramukhas,* Uma-Mahesvara and Mahishasuramardini,
-do-	Gulahgarh	Grey ware
-do-	Hatwal	Potsherds of the Kushana period, saddle querns, mullers and medieval sculptures
-do-	La-Devi Mandir	Medieval sculptures of Mahishasuramardini, Ganesa and architectural members
-do-–	Majra Nug	Medieval mound
do-	Nug Nauna	Early medieval and medieval sculptures of Vishnu (standing), Uma-Mahesvara, Ganesa, Lakshmi and *bhadramukha* besides the male and female figures and the architectural pieces like *amalaka,* door-jamb, etc.
-do-	Toka Nagla	Medieval sculptures of Vishnu, Uma-Mahesvara, Ganesa, Mahishasuramardini, *bhadramukha,* male and female figures and architectural members.

The Siva temple, datable to the post-Gupta period, at village Mangarh, enshrines a linga in the *garbha-griha,* measuring 110 X 70 cm. The ornate doorway of the temple measures 140 X 70 cm. The image of Ganga and Yamuna alongwith those of *dvarapalas* arc placed besides the lower parts of the doorway. The upper part of the doorway has the figure of an *apsara* having mirror in her hand. The *navagraha* panel shows the image of Surya on a chariot driven by seven horses. The *mandapa* has flat ceiling which rests on four square pillars. The sculptural wealth of the temple is represented by *bhadramukha* (173 X 60 cm), Ganesa (37 X 24 cm), seated yogi (30 X 20 cm), Mahishasuramardini (54 X 33 cm), Uma-Mahesvara (48 X 30 cm), Nandi (86 X 60 cm), *amalaka* (75 cm in dia.) and lion trampling elephant (140 X 100 cm).

33. EXPLORATION IN DISTRICT UNA.—Lalman of the Department of Ancient Indian History, Culture and Archaeology, Punjab University, Chandigarh, explored the following sites of archaeological interest:

Taluk	*Village/Site*	*Nature of remains*
Amb	Amb	Medieval sculptures representing Siva, parvati and Ganesa
-do-	Bhadrakli	Medieval sculptures
-do-	Fatehpur	Late medieval sculptures representing Ganesa, Nandi and *Siva-linga*
-do-	Prithipur	Medieval and late-medieval sculptures representing Nandi and *Siva-linga*
-do-	Tundkhari	Medieval sculptures representing Siva-Parvati, Ganesa and Mahishasuramardini, and architectural pieces
-do-	Dilwan	Grey ware, red ware, saddle querns and grinders
-do-	Ishpur	Early historical site
-do-	Sammurkalan	Early historical, grey ware, black-slipped ware, sculptures belonging to Kushana and medieval periods and architectural pieces

JAMMU AND KASHMIR

34. EXPLORATION IN ZANSKAR, DISTRICT KARGIL.—R.S. Fonia assisted by L.P. Thapaliyal, Puran Singh, A.K. Patel and Balbir Singh of the Srinagar Circle of the Survey carried out exploration along the bank of the rivers Zanskar, Suru and their main tributaries and noticed the following sites:

Taluk	*Village/Site*	*Nature of remains*
Kargil	Byana Khumbu	Rock carving showing Padmapani flanked by two goddesses and inscription of *circa* seventh-eighth century
-do-	Kartse Khar (34°16'; 76°3')	Rock-cut sculpture of Maiterya *(circa* seventh-ninth century AD)
-do-	Rungdum (34°6'; 76°25')	Buddhist monastery with stucco images, *thankas,* murals, etc.
Padam	Bardan	Seventeenth century Buddhist monastery with murals
-do-	Dzongkhul	Cave temple with stucco figures
-do-	Karsha (34°0'; 76°3')	Buddhist monastery with stucco images, murals, inscription, etc.

Taluk	*Village/Site*	*Nature of remains*
Padam	Padam (33°28'; 76°54')	Rock carvings depicting five Dhyani-Buddhas and *chortens* of *circa* sixth-seventh century AD
-do-	Phe (33°38'; 76°44')	Buddhist monastery, stucco figures, *thankas,* and murals of tenth century and primitive rock engravings
-do-	Rizing	Buddhist monastery with murals and *thankas*
-do-	Sani (33°35'; 77°0')	Buddhist monastery with stucco and bronze images, murals and Kanika *chortens,* rock carving of Maitreya, etc.
-do-	Tonde (33°3O'; 77°0 ‘	Buddhist monastery with murals and *thankas,* rock carvings of ibex, hunting scenes, etc.
-do-	Zangla (33°40'; 76°50')	Buddhist monastery with stucco figures, old castle etc.

35. EXPLORATION IN DISTRICT LEH.— S.B. Ota assisted by S.K. Lekhwani, N. Taher and R.K. Dwivedi of the Prehistory Branch of the Survey, carried out exploration in Upper Indus Valley in the region between Hemis and Alchi and brought to light a stone age and three historical sites.

Stone artefacts (pl. XIII) were collected from Alchi (34°13' 19"; 77° 10" 35"), on the left bank of the Indus. The artefacts included an unifacial chopper, three bifacial handaxes and a retouched worked block. Handaxes were made up of fine grained brown quartzite, whereas the chopper and the retouched blocks were of breccia and schist respectively. On the basis of typo-technology, the assemblage appears to belong to the Lower Palaeolithic cultural phase and is significant for the fact that it is the northern most stone age site located so far.

Habitational sites of historical period were located on the foot-hill areas near perennial streams, at the village jurisdiction of Snegmo, also known as Nimu (34° 11" 14"; 77° 20' 20'), Stok (34° 4' 37"; 77° 30" 33"), Ranbirpura (34° 2" 21"; 77° 40' 45'), and Matho (34° 0" 10"; 77° 39' 40- All the sites lie at the altitude between 3160 and 3400 metre. The ceramics collected from these sites were red ware, with varying thickness. The shapes of the ware were vases, shallow dishes and bowls. Some of the potsherds bear incised designs. Other antiquities included a bored stone, a jasper bead and some fragmentary animal bones.

36. SCIENTIFIC CLEARANCE, TISSERU STUPA, DISTRICT LEH.—In continuation of the previous year's work *(1987-88,* p. 31), R.C. Agrawal and R.S. Fonia, assisted by A.K. Pandey, Vijay Shankar, A.K. Patel, B.S. Jamwal, Tsering Wangchuk and Tsewang Thinles of the Srinagar Circle of the

Survey, undertook scientific clearance work of Tisseru Stupa to expose its different structural parts on the unexcavated western side.

During the course of clearance the lower and the upper circular terraces of the stupa were exposed. The terrace walls were built of stone rubble masonry in mud mortar. Traces of plasters were also noticed at places. The lower portion of the circular terrace was decorated with the paws of lion figure and floral design in relief on the western side. Three square passages, on the upper circular terrace, leading to the interconnected inner chambers were exposed. The ceiling of these passages were made of wooden twigs. The passage on the western side was found to be damaged.

The antiquities recovered during the course of this work included a number of clay tablets depicting Sakyamuni Buddha, Manjusri, Tara, Mahakala, Samvara and *chortens.*

KARNATAKA

37. EXPLORATION IN DISTRICTS BANGALORE, MANDYA AND TUMKUR.—M.V. Visweswara of the Bangalore Circle of the Survey noticed the following sites of archaeological interest:

District	*Taluk*	*Village/Sites*	*Nature of remains*
Bangalore	Bangalore (South)	Madivala	Temple of Chola period (*circa* tenth-eleventh century), sculptures of Mahishamardini, Karttikeya, Ganapati and Surya
Mandya	Krishnarajpet	Madanayakanahalli	Inscribed and uniscribed herostones of Ganga period datable to the ninth-tenth century
-do-	Krishnarajpet	Madanayakanahalli	Inscribed slab, Siva temple and sculpture of Vishnu in *Samabhanga* posture, all belonging to the Hoyasala period (*circa* eleventh century)
-do-	Krishnarajpet	Sindaghatta	Inscribed slab, two Siva temples with sculptures of *Saptamatrikas*, Ganesa, Karttikeya on peacock, Vishnu and Surya-Narayana, all belonging to the Hoysala period (twelfth century)
Tumkur	Honnavalli	Pattaddevarahalli	Fragments of inscribed slab and a Siva temple, both belonging to the Hoyasala period (twelfth century).

38. EXPLORATION IN DISTRICT BANGALORE AND UTTARA KANNADA.—S.S. Nayak of the Bangalore Circle of the Survey identified the following sites:

District	*Taluk*	*Village/Sites*	*Nature of remains*
Bangalore	Bangalore (North)	Krishnarajpur	Inscription of Ganga period *(circa* eighth-ninth century), Lakshmi-Narayana temple, Mahabalesvara temple and sculptures of Vishnu, Narasimha and Ganesa of late Vijayanagara period
Uttara Kannada	Siddapur	Thanya	Siva temple and a sixteenth century inscription
Uttara Kannada	Sirsi	Nilkund	Virabhadra temple of Sonda period *(circa* seventeenth century)

39. EXPLORATION IN DISTRICT BELGAUM.— K. Venkateswara Rao, S.S. Nayak and M.V. Mallikarjuna of the Bangalore Circle of the Survey noticed a mud-fortification on-a hillock locally called 'Bodke Tembe' in the vicinity of Halshi in taluk Khanapur. Antiquities collected from the site included red ware, akin to that of late-and post-Satvahana period and a few medieval sculptures.

40. EXCAVATION AT HAMPI, DISTRICT BELLARY.—In continuation of previous year's work *(1987-88,* pp. 33-37), the Hampi National Project of the Survey under the direction of B. Narasimhaiah and K.P. Poonacha, assisted by K.Veerbhadra Rao, Hanumanthappa Telagu, M. Loganathan, T.P. Balakrishana Unnithan, Ananda Tirtha, V.N. Joshi and A. Naomi Snehalata of the Bangalore Circle of the Survey, resumed excavation at Hampi with the objective of exposing the structural remains in the area between the Royal Enclosure and the Hazara Ramachandra temple complex and the area to the east of the Hazara Ramachandra temple. The excavation in above areas brought to light remains of many structures, a stone-paved medieval road and a network of aqueducts and channels for supplying water to these areas.

An area of about 22,500 sq metres was combed to the east of the Hazara Ramachandra temple. The area to the north of the tank, which had been partially exposed during last season, did not yield any structural remains and was full of pits, dug probably to quarry gravel to meet the demands of constructional activity elsewhere in the capital city.

Excavation in the area to the north-east of the tank of the Hazara Ramachandra temple were continued which revealed remains of stone-paved road connecting the arched gateway and the Hazara Ramachandra temple. The paved stones were roughly dressed rectangular granite slabs, placed lengthwise in the north-south direction. The road was laid by cutting the bed-rock upto the requisite level and filling thereafter by upto the required level by the quarried stone. A channel built of the long stone blocks, meant to feed water to the tank, was also exposed.

Excavation near the Saivite temple, located to the east of the Virabhadra temple, brought to light several architectural members belonging to the *prakara* of the temple, and the original stone-paved floor. From the section of accumulated debris it appears that the area was levelled in later times.

The area to the west of the King's Audience Hall (pl. XIVA) which had earlier yielded the Buddhist panels, was subjected to excavation with a view to expose structural remains and to understand their relationship with the Audience Hall. Excavation here revealed part of a much disturbed platform with two rows of pillar bases, separated by a distance of 2.40 m dividing the platform into three bays. A number of greenish-white quartz and chloritic schist stone blocks, were found stacked. A fragmentary lime-stone pillar (1.82 m high), having half-lotus medallions in low relief on three sides, resembling *ayaka*-pillar, was an interesting find. The upper part of this pillar was chiselled into hemispherical shape, probably to use as a *Siva-linga,* feature also noticed in the Amaravati area.

A miniature model of *vesara sikhara* (later Chalukyan type), made on bluish-grey chloritic schist (soapstone), belonging to the pre-Vijayanagara times, was another intresting find (pl. XV).

Excavation in the area between the King's Audience Hall and the Hazara Ramachandra temple, brought to light a shallow (35 cms deep) rectangular (6.55 X 3.82 m) tank (pl. XIVB), the inner surface of which was lime plastered. A small trough and a stone basement with a number of rubble walls, criss-crossing each other, were also exposed.

The antiquities recovered from the different areas included different architectural members, copper, gold and stone objects and earthenware. Noteworthy among them were *Siva-linga,* copper coins and a gold coin of the *rasipana* variety.

The Department of Archaeology and Museums, Karnataka Government, Mysore, continued excavations in the Nobleman's Palace area, Nobleman's Palace 15, which lies to the north-west of Palace 12. This structure, facing east, consisted of three platforms. Access to the structure was from the gateway at the centre of the eastern enclosure wall which led to the open courtyard. Through this open courtyard the way leads to the first landing. At the north-west and south-west corners were flight of steps leading to the second landing, in the centre of which is a raised platform. The walls were made of stones set in mortar and the uppermost platform was provided with lime plastered basement, which was tripartite type with slight variation in the topmost platform. The antiquities recovered from the area included iron pegs, nails, needles, stone pencils, glass bangles and cowry shells.

From the gateway, to the south of the tourist canteen, a road from Hazara Rama temple was found leading to this complex (Nobleman's Palace?). On either side of the gateway were platform, attached to fortification walls, over which were found remains of small rooms. These platforms were made over the basements having three parts. To the east of these platform was found a shallow water trough and seven small rooms in a row. A drain of later period was found at the centre of the gateway.

Behind the western platform were found skeletal remains of an elephant near which were lying 38 human skulls. An inscription from the Narasimha temple refers to this place as elephant stable.

41. EXPLORATION IN DISTRICT BIDAR.—In the course of the survey of the submersible area under

Karanja Irrigation Dam Project, J. Vara Prasada Rao and C. Rama Devi of the Hyderabad Circle of the Survey noticed following sites of archaeological interest:

Taluk	*Village/Site*	*Nature of remains*
Bhalki	Kamalpur	Mesolithic, medieval sculptures and site
Bidar	Hajjargi	Medieval sculptures and early medieval site
-do-	Nilwad	Mesolithic and medieval sculptures
-do-	Sangolgi	Medieval sculptures and early medieval site
Umnabad	Atwal	Mesolithic, medieval site and loose sculptures
-do-	Dakulgi	Medieval sculptures
-do-	Sindbandgi	Mesolithic and medieval sculptures

42. EXPLORATION IN DISTRICT CHITRADURGA.—The Directorate of Archaeology and Museums, Government of Karnataka, conducted exploration in the District and noticed the following archaeological remains:

Taluk	*Village/Site*	*Nature of remains*
Chitradurga	Arasanagappa	Medieval Saptamatrika panels
-do-	Bagenal	Medieval Saptamatrika panel
-do-	Bahaddurgappa	Post-medieval Gaja-Lakshmi figure
-do-	Bevinahalli	Medieval Nandi figure
-do-	Bharamsagara	Medieval Ganapati figure
-do-	Haravaduru	Medieval Vishnu image
-do-	Hosahalli	Hero-stone
-do-	Kadlegudda	Hero-stone
-do-	Kodirangavanahalli	Medieval sati pillar
-do-	Managi	Hero-stone
-do-	Palatihal	Medieval Saptamatrika panel
-do-	Palya	Hero-stone
-do-	Sadarahalli	Hero-stone
Iolalkere	Duggavara	Medieval Kali image
-do-	Halehalli	Medieval Nandi figure
-do-	Horakedevapura	Medieval sculptures of devotee
-do-	Kanivejogihalli	Medieval Kali image
-do-	Madderu	Sati pillar
-do-	Shivaganga	Hero-stone

43. EXCAVATION AT SANNATI, DISTRICT GULBARGA.—In continuation of previous year's work, (*1987-88,* pp. 37-38), A.P. Sagar and G.V. Sreenivas Rao assisted by R.V. Siva Sarma, J. Vara Prasad Rao, T.C. Ratnam, A. Suresh and Ghayasuddin of the Hyderabad Circle of the Survey and James Howell assisted by Annie Howell of the Society for South Asian Studies, United Kingdom, resumed the excavation at the stupa mound of the site.

A 2 m wide transectional cutting was made from the centre of the mound to the southern end of the mound with the objective to have a complete longitudinal cross section and to correlate with the different constructional phases. The work revealed the cuttings made into the black-cotton soil for the foundation of the drum portion of the Stupa. The excavation also revealed the stratigraphical position of the brick platform, roughly square in shape, which is later than the stupa.

Excavation in the south and south-western periphery of the mound revealed the southern extent of the slate-stone filling, was veneered with two courses of bricks. After removing the slate stone filling, it was found that the four pits were dug into the virgin soil through the slate-rock filling, almost at the central point of the platform. These pits were surrounded by ellipsoidal shallow pits. Of the four main pits, three were oriented north-south and the fourth, at the north-eastern corner, was in the east-west direction. The bottom of these pits had a rectangular linear shallow cut line, perhaps marking the impression left by the stone-slab. A memorial stone pillar was found west of this platform. Probably these memorial stones were covered on all the four sides by limestone uprights, over which a roof was provided. On this ground, the platform was built as a memorial platform. To the west of the platform, was found four post-holes, perhaps the reminiscent of the pillars supporting the shade like pavilion attached to the platform. Similar post-holes, though only two in number, were noticed to the north-western side of the platform.

The antiquities recovered from the site included glass beads, iron nails, objects of copper alloy, kohl sticks, lead and copper coins of the Satavahana period.

44. EXPLORATION IN DISTRICT KOLAR.—During the course of village-to-village survey, P.S, Sriraman of the Bangalore Circle of the Survey, noticed the following sites:

Taluk	*Village/Site*	*Nature of remains*
Mulbagal	Agara	Sixteenth century hero-stone
-do-	Alampur	Elaborately carved hero-stone of sixteenth century
-do-	Madivala	Fragmentary tenth century Kannada inscription
-do-	Motakapalli	Early medieval mound, tenth century Kannada inscription, hero-stone, Jaina Tirthankara images and an eleventh century Saptamatrika temple
-do-	Timmaravattanahalli	Inscribed tenth century hero-stones and Saptamatrika images of Chola period

45. EXCAVATION AT WATGAL, DISTRICT RAICHUR.—Jim G. Shaffer and Frank J. Cantelas of the Department of Anthropology, Case Western Reserve University, Cleveland, Ohio, Diane A. Lichtenstein of the Department of Sociology and Anthropology, Baldwin Wallace College and the Cleveland Institute of An, Cleveland, Ohio, Stanley M. Parks of the Department of Anthropology, University of Nebraska, Lincoln, Nebraska, Douglas W. Dibble and Kirsten E. Westphal of the Cleveland Institute of Art, Cleveland, Ohio and Balasubramanya of the Department of Archaeology and Museums, Government of Karnataka took up excavations at Watgal.

The excavation of the site was preceded by surface study which indicated presence of the Black-and-red ware and pottery of the historical and medieval periods. A study of the excavations carried out by the local people for top soil indicated that the eastern half of the southern side of the mound had more habitational deposits, beginning from the pre-early historic times. A trench, taken in this area for regular excavation, yielded handmade red and grey wares, wheel-turned dull red ware, often with blackened interior. Among the dull red ware, the predominant shapes were bowls and collared jars.

The lithic appendage included microlithic tools, made on flint, chalcedony and banded agate, like retouched blades, crescents and fluted cores, fragments of celts on black basalt, whetstone, milling stone and hammerstone, both made of granite and beads of steatite and shell.

The remains of one infant burial was found, in which the body was laid extended and supine with head to the north-east. The body appeared to be wrapped in a white fibrous material. In another burial, the body of a child, less than one year in age, was found placed in two dull red ware jars put together in a mouth-to-mouth position. The body was slightly flexed, supine, arms placed on the chest, the head to the north-east and facing west. In adult male burial the body was placed in a shallow narrow pit, laid the supine in an extended position with head to the north and right arm across the pelvis. The age of the buried person was determined to be between 16 and 23 years. No associated artefacts were found.

Several individual groups of geometric, anthropomorphic and zoomorphic petroglyphs were found on the southern outcrop. The most interesting scene was of a humped bull being attacked by a dog, or as per the local people's belief a tiger. A circular megalith, having two concentric circles of large granite boulders with a possible southern entrance was also excavated. The diameter of outer circle was 10.3 m north-south and 10-9 m east-west and that of the inner circle being 8-25 m north-south and 8.02 m east-west.

46. EXPLORATION IN DISTRICT SHIMOGA.—C.S. Seshadri of the Bangalore Circle of the Survey, under the village-to-village scheme, noticed the following sites of archaeological interest:

Taluk	*Village/Site*	*Nature of remains*
Shikaripur	Adaganti	Later Chalukyan *(circa* thirteenth century) sculptures and inscribed slab

Taluk	*Village/Site*	*Nature of remains*
Shikaripur	Ambligola	Later Chalukyan *(circa* twelfth century) sculptures and inscribed slab
-do-	Baganakatte	Inscribed slab *(circa* thirteenth century) and sati-stones
-do-	Bannur	Hero-stone and sati-stones *(circa* twelfth century AD)
-do-	Begur	Temple, inscriptions and later Chalukyan sculptures
-do-	Bhadrapura	Later Chalukyan sculptures
-do-	Channahalli	Inscribed slab *(circa* eighteenth century AD)
-do-	Chikkapura	Inscribed hero-stone *(circa* twelfth century AD) and Hoysala sculptures
-do-	Chunchinakoppa	Sculptures *(circa* sixteenth century AD)
-do-	Donanaguddi	Later Chalukyan sculptures
-do-	Dupadahalli	Hero-stones and sati-stones
-do-	Erekoppa	Inscribed slabs *(circa* twelfth century AD)
-do-	Gabbur	Inscribed hero-stones *(circa* twelfth century AD)
-do-	Gogga	Inscribed hero-stones *(circa* twelfth century AD) and sati-stones
-do-	Guddadahosahalli	Inscribed slabs and hero-stones *(circa* twelfth century AD) and later Chalukyan sculptures
-do-	Guladahalli	Medieval fortification
-do-	Hakkali	Sculptures *(circa* sixteenth-seventeenth century AD)
-do-	Halemugalagere	Later Chalukyan sculptures
-do-	Harige	Inscribed hero-stones and sati-stones *(circa* fifteenth century AD)
-do-	Harogoppa	Inscribed slabs *(circa* thirteenth century AD), medieval fortification, sati-stones and hero-stones
-do-	Hirekoralahalli	Inscribed slab *(circa* seventeenth century AD)
-do-	Hotanakatte	Vijayanagara sculptures
-do-	Hulginakatte	Medieval fortification and sculptures of Vijayanagara period
-do-	Ittigehalli	Hoysala sculptures
-do-	Kenchigondanakoppa	Inscribed slabs *(circa* seventeenth century AD),
-do-	Kengatti	sati-stones

Taluk	*Village/Site*	*Nature of remains*
Shikaripur	Kesarukatte	Sculptures and architectural members *(circa* seventeenth century AD)
-do-	Kittadahalli	Sculptures of Hoysala period
-do-	Kotipura	Sculptures (*circa* fifteenth century AD)
-do-	Kotta	Inscribed slab (*circa* ninth century AD), inscribed sati-stones *(circa* thirteenth century AD) and later Chalukyan sculptures
-do-	Madag	Medieval fortification
-do-	Madagadaharanahalli	Later Chalukyan sculptures
-do-	Maravalli	Inscribed slab and inscribed hero-stones *(circa* eighth century AD) and sati-stones
-do-	Mastigere	Inscribed hero-stones *(circa* thirteenth century AD)
-do-	Mattikote	Inscriptions *(circa* seventeenth century AD)
-do-	Mudaba Siddapur	Medieval fortification and sati-stones
-do-	Muddanahalli	Inscribed hero-stones *(circa* twelfth century AD)
-do-	Mulakoppa	Sati-stones
-do-	Nagihalli	Inscribed slab *(circa* eighteenth century AD)
-do-	Nelavagillu	Sati-stones
-do-	Sadapura	Medieval fortification
-do-	Saloor	Inscribed slabs (eighth century AD) and inscribed hero-stones *(circa* thirteenth century AD)
-do-	Sankalapura	Sati-stones
-do-	Sidaganahalu	Medieval fortification
-do-	Suragihalli	Temples and sculptures of Hoysala period
-do-	Taralagatta	Inscribed slab *(circa* twelfth century AD)
-do-	Tumri Hosur	Inscribed hero-stones *(circa* thirteenth century AD) medieval fortification and sati-stones
-do-	Vadagatta	Sati-stones
-do-	Vaderpura	Inscribed sati-stones *(circa* thirteenth century AD)
-do-	Yalaneerakoppa	Sati-stones
-do-	Yerekatte	Temple (*circa* sixteenth century AD)

47. EXCAVATION AT GUDNAPUR, DISTRICT UTTARA KANNADA.—The Bangalore Circle of the Surveys under the direction of K.P. Poonacha, assisted by S.V. Venkateshaih, S.S. Nayak, M.V. Visweswara, C.S. Seshadri, S.G. Samak, M.M. Hadpad, G. Krishnamurthy, V.M. Joseph and Ananda

Tirtha carried out excavation in the area adjacent to the Virabhadra temple, from where the pillar inscription of the Kadamba King Ravivarman (AD 485-519), structures, brickbats and pottery were found. The main objectives of the excavation were (i) to understand, and (ii) to correlate the structural remains with the structures described in the inscription of Ravivarman.

The excavation in the eastern periphery of the mound (pl. XVIA) revealed 0-90 m wide brick wall probably joining part *of the prakara.* This wall, with an extant height of 0.82 m and comprising eight courses of bricks, was exposed to a length of 9 m in north-south direction. On the inner side, a wall (1.60 m wide 0.27 m height) parallel to the *prakara* and two other walls perpendicular to it were exposed. The wall parallel to the *prakara* was traced to a length of 9.30 m. Of the perpendicular walls, the southern wall (extant height 1.06 m) was traced to a total length of 30 m, with interruptions. At the western end, this wall was found to turn southward and continued to run to a length of 10 m in north-south direction. At a distance of 3.50 m, another wall, parallel to the above wall, was also traced to a length of 10 m. In between these, two east-west oriented walls, separated by a distance of 2.10 m, formed two roughly rectangular chambers. Parallel to the main east-west running wall was found a 0.58 m, high rectangular platform (2.50 m X l.40 m). This platform was built of five courses of burnt bricks and dressed laterite blocks placed alternatively. To the west of this platform was exposed another wall upto a length of 4-25 m in east-west orientation (pl. XVIB). The extant portion measured 0.75 m in height, comprising eight courses of bricks (fig. 7a). On the northern side of the wall as well as of the platform described above, four square pillar-bases, with 0.20 m square sockets were found at regular intervals.

Excavation in the south-western periphery of the mound revealed part of a large structure comprising of a rectangular chamber with an enclosure. The walls of the chamber were at a higher level than those of the enclosure. The chamber had a basement, the lower portion of which was built of laterite blocks and the upper portion was of burnt bricks. The chamber measures roughly 3.50 m north-south and 3 00 m east-west, with an entrance (1.05 wide) on the northern side. The northern face of this wall shows several offsets of moulded bricks (fig. 7b). The offset continue on the eastern face of the wall running north-south. The outer walls, enclosing the chamber at a distance of 1.25 m, were built entirely of burnt bricks, except the southern wall, which was built of large-sized laterite blocks (0.45 X 0.25 X 012 m). The maximum height of the extant enclosure wall was 0.98 m, comprising thirteen courses. On the northern side, the inner and outer walls were found to be connected and the outer wall, running east-west, had an entrance in the middle. This wall, with the extant height of 0.87 m and composed of eleven courses, was exposed to a length of 5.25 m. In the space between the two structures, and all along the periphery of the outer wall with moulded courses, was a brick-paved passage with a drain covered with thin slabs of basalt.

To the east of this structure, part of another rectangular structure built of laterite blocks was exposed. The width of the walls vary from 0.45, to 0.90 m. The extant height of the comparatively better preserved western wall of this structure was 0-90 m with nine courses. The northern wall had two rectangular pilaster holes (0.90 X 0.20 m) separated by 0.80 m from each other.

The structures exhibited a uniform method of construction of laying the bricks and laterite

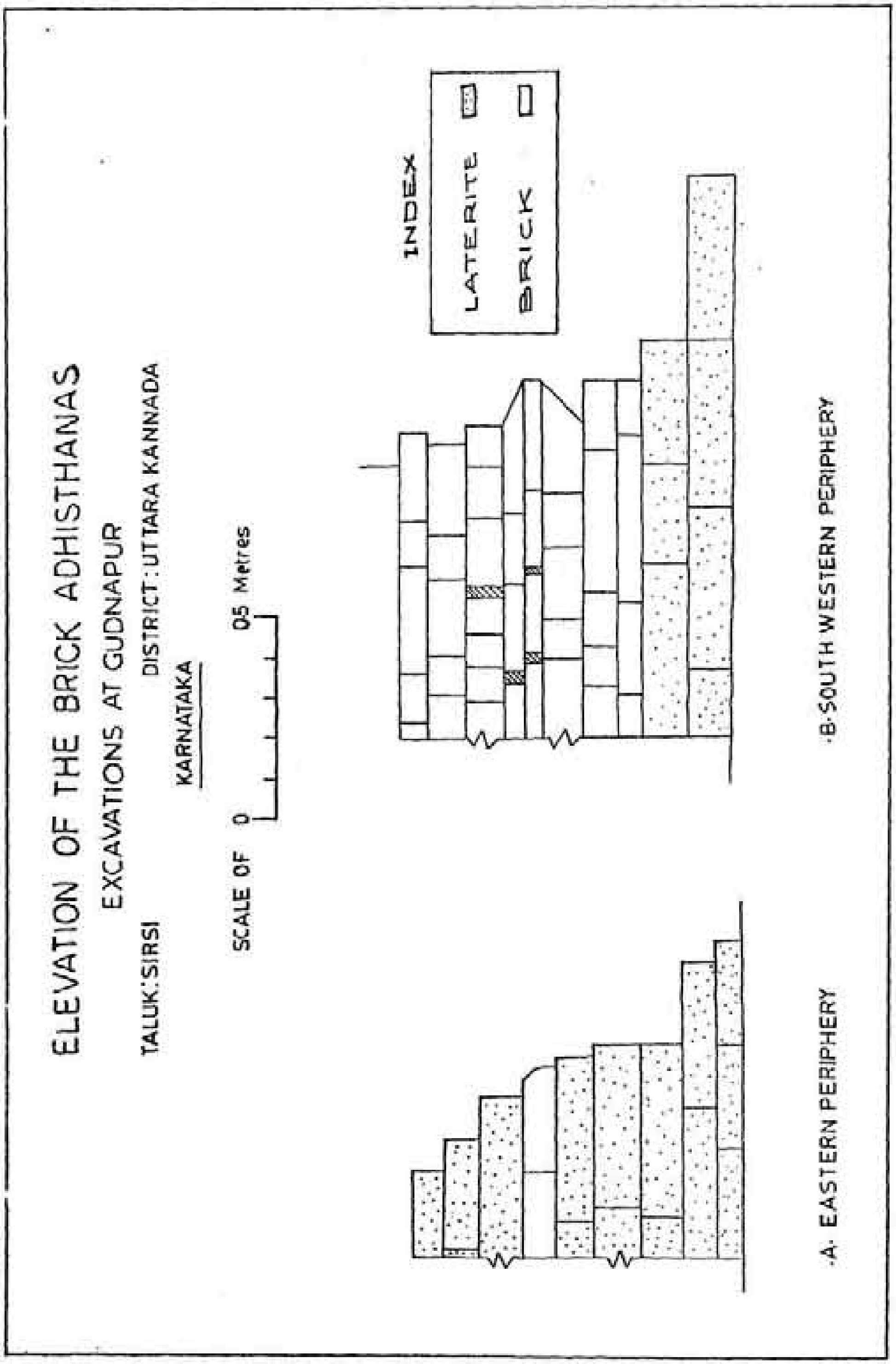

ELEVATION OF THE BRICK ADHISTHANAS
EXCAVATIONS AT GUDNAPUR
TALUK: SIRSI
DISTRICT: UTTARA KANNADA
KARNATAKA
SCALE OF 0
0.5 Metres
INDEX
LATERITE
BRICK
A. EASTERN PERIPHERY
B. SOUTH WESTERN PERIPHERY

FIG. 7.

blocks in typical header and stretcher fashion, laid in fine gritty clay mortar. The walls were invariably raised over the level ground without any foundation but for a ledge of 5-10 cms in the lowest course. At places, the exterior of the wall had a pavement of the width of only one brick, obviously to prevent rain-water from entering the structure. The brick-paved passage with provision of shallow drain covered with thin slabs of basalt is quite significant.

The ceramics recovered from the site, during the course of the excavation, included red, red-slipped, and dull grey wares in which the types were cooking-pots and other household utensils, a variety of spouts, sprinklers (pl. XVII A) and lamps. A miniature pot of celadon, having the characteristic crackled surface and floral decoration, was a significant find (pl. XVIIB). A large number of flat and multi-cusped roof-tiles of the early historic period were also found.

Among the important antiquities unearthed were the bust of a female figure; torso and head of a Jain *yaksha* (pl. XVII C); inscribed and uninscribed *nishidi-stones* of tenth-eleventh century AD; as silver bangle; plain ingot and rings, long needle, all of copper; leaf-shaped spearhead; and variety of nails of iron (pl. XVII D) and tubular terracotta beads.

MADHYA PRADESH

48. EXCAVATION AT KHAJURAHO, DISTRICT CHHATARPUR.—In continuation of the previous year's work *(1985-86,* p. 48), G.T. Shende, assisted by Narayan Vyas, P.K. Mishra, Rekha Radha Vallabhi, Manual Joseph, M.I. Peshwani, R.K. Shrivastava and D.K. Lokhande of the Bhopal Circle of the Survey, resumed the excavation with a view to further expose the remaining part of the brick plinth wall and other structures.

Excavation revealed a big damaged brick plinth of the temple having compound built of stone and bricks. Close to this platform, another small platform and a small temple shrine made of bricks were exposed, which probably were a later addition. The second brick platform was built to give support to the former brick plinth. At the eastern side of the mound, a much damaged brick (measuring 34 X 20 X 5 cm) wall, about 10 m in length and 1.10 m in height and a ruined miniature shrine of granite on top of the mound were also exposed. To the north of the plinth within the compound traces of brick bat floor were also exposed.

Ceramics were represented by red ware and black ware. The antiquities included terracotta beads and animal figurines; iron objects; copper ring, architectural fragments like *makara-pranala,* etc. Some of the architectural fragments, having masons marks were also noticed. A sandstone head of Vishnu decorated with *kirttimukha,* datable to the Chandela period, was an interesting find.

On the basis of the archaeological remains, the establishment at the site was divided into two periods: Period I, Post-Gupta or Pratihara, and (ii) Period II, Chandela.

49. EXPLORATION IN DISTRICTS CHHATARPUR AND JABALPUR.—The Directorate of Archaeology, Bhopal reported discovery of sixteen temples, datable between ninth century and eleventh century near village Vyas Badaura in Tehsil Laundi in District Chhatarpur; ten temples (only one temple in

a dilapidated condition) in a jungle, datable to the later Gupta period, from village Made Devara, the Tehsil Kami, District Jabalpur.

On the basis of the architectural style, the temples at the village Made Devara, appear to be earlier than the Parvati temple and Siva temple at Nand Chand or Chaturmukha temple at Nachna, District Panna. A slab containing inscription (33 X 33 cm) in the Brahmi script of the sixth-seventh century characters and Sanskrit language was found lying nearby.

50. EXCAVATION AT KOTRA, DISTRICT DEWAS.—C.B. Trivedi, assisted by S.N. Mishra, Manish Jhabak and Umesh Kumar Sharma, of the Prachya Niketan, Centre of Advanced Studies in Indology and Museology, Bhopal affiliated to Barkatullah University, Bhopal, conducted excavation at the rain-gully cloven mound, oriented north-south and measuring 250 X 30 X11 m and 150 X 80 X 5m respectively, near village Kotra, on the western bank of the Kalisindh, a tributary of the Chambal. Two trenches (KTR-1) oriented east-west on the Garhi mound across the mud wall and the other (KTR-2) oriented north-south at a place 7 m from the northern fringe of mud fortification wall in a cultivated field adjoining a house, were taken up for the excavation. The cultural sequence at both the sites was as follows:

Period	KTR-1 (Layers)	KTR-2 (Layers)
IA	8 and 9	6
IB	6 and 7	3 to 5
II	4 and 5	1 and 2
III	1 to 3	absent

Period IA *(circa* 1800-1700 BC) was found to rest on the natural soil of black-brown colour. The ceramic industry of the period was represented by handmade pots and those turned on slow wheel and were coarse to medium in fabric, some of which were treated with thick chocolate and plum-red slip. Lustrous red ware, white-painted black-and-red ware akin to Ahar variety (pl. XVIIIA), drab and rusticated ware, simple red ware with ochre wash, decorated ware with incised designs showing row of diamonds (pl. XVIIIB), zig-zag lines, herring-bone and honeycomb designs, wavy lines and trellis-pattern, were also met with. The types included storage jars, *handis* with outward flaring rim, deep bowls, bowls and large basins.

The lithic appendage included parallel-sided blades and lunates, made on siliceous material; sling balls; pestles, pounding balls and querns, made on basalt.

Remains of a mud wall, measuring 65 metres in length and 38 in width, having post-holes, burnt clay lumps with impressions of wooden and reed posts and floor made of rammed earth mixed with kankar and burnt clay were encountered. Due to the limited area of excavation, however, no complete house-plan could be exposed (pl. XIX A).

Period IB *(circa* 1700-1500 BC) was marked by overlap of chalcolithic black-on-red ware and white-painted black-and-red ware of Ahar and Malwa fabrics. Drab red pottery and incised pottery,

of preceding period, were also continued in this sub-period. Paintings (pl. XIX B) on the pots were executed in black or brown, generally on the upper part of the wares, the designs included vertical wavy, horizontal bands, oblique strokes, geometrical and chequered designs, loops, diamond in rows, date-trees, wheat-ears, etc.

Antiquities recovered included stone objects like pestles, mullers and querns; terracotta objects like toy, wheels; discs, hopscotches, bulls and cakes; and beads of copper, stone, steatite and terracotta. The cultural remains of this phase were found to be akin to those from Nagda and Navadatoli.

Period II, representing the Malwa Culture *{circa* 1500-1200 BC) was marked by the occurrence of black-on-red ware. The ceramics of the preceding period disappeared, but the painted designs of the earlier period continued, which included stylized animals, snakes, deer, sun, trident and various geometrical and chequer patterns (pl. XX). The pottery types of the preceding period continued, and the *'lota'* was the dominant shape of this period. Mention may be made of a painted stem of dish-on-stand.

The structural activities, in the form of floor made of rammed bricks and concrete blocks brought from the river, was noticed. Burnt lumps of wood, impression of wattle and daub, and post-holes were suggestive of houses which were made of perishable material.

Among the antiquities recovered, mention may be made of discs, hop-scotches, miniature stone-balls, blades, lunates, stone pellets, hammerstones, mullers, fabricators and beads of terracotta and copper.

Period III *(circa* 750-300 BC), restricted only to the KTR-1 mound, was characterized by the black-slipped, black-and-red, and NBP wares. The ceramics of earlier period disappeared completely. Perhaps the people of this period occupied the site after a break of few centuries. The main ceramic types were *handis,* rimless bowls, lids with circular knob, shallow lids, etc.

Structural remains included a massive mud wall, measuring 2-39 m wide with an extant height of 49 cm and 23 cm in the northern and southern sections respectively. The houses were constructed of mud and the debris of the preceding period. Remains of burnt clay with reed and bamboo impressions and tiles indicated the existence of houses made of perishable materials with the roof covered with tiles.

The antiquities of the period included bone stylus and arrowheads; terracotta discs, human figurine made on potsherds, gamesmen, wheel; shell and glass bangles; nails and spearhead of iron; copper ring; and one punch-marked coin.

51. EXCAVATION IN DISTRICT DHAR.—Manual Joseph of the Bhopal Circle of the Survey located an ancient mound with potsherds at village Nagda, Tehsil Banavar ; a tank at Abdulpura, Tehsil Dharampuri; and a tank, *baoli* and sculptures at village Kalibaodi, in tehsil Manavar.

52. EXPLORATION IN DISTRICT EAST NIMAR.—In continuation of previous year's work *(1987-88,* pp. 44-49), S.S. Gupta of the Prehistory Branch of the Survey, carried out exploration in the area to

be submerged under the Narmada Sagar Dam, in Tehsils Khandwa and Harsud of the district and brought to light the following sites of archaeological interest:

Village	*Nature of remains*
Amoda	Early historical
Amota	Early historical
Baldeva Dongri	Early historical
Bandhania I	Acheulian
Barkhera Kalan	Early historical
Bhagwanpura	Early historical
Bhogani	Late Acheulian
Bhurlay	Early historical
Bori	Early historical
Bir	Early historical
Chandgarh	Acheulian
Chich	Acheulian
Chandel	Early historical
Devla	Early historical
Dinkarpura	Early historical
Dharikotla	Acheulian, Middle Stone Age and Early historical
Feriaketa	Early historical
Jamunia	Acheulian
Jatam	Acheulian
Kathawari	Late Acheulian and late historical
Mathni	Early historical
Mora	Acheulian
Nandana	Early historical
Pamakheri	Acheulian
Piplani	Acheulian and early historical
Richi Mafi	Early historical
Selda	Early historical
Siwar	Acheulian and early historical
Somgaon	Late Stone Age and late historical

Most of the prehistoric sites, including Acheulian and Late Stone Age, were found located on the banks of the Narmada, though some of them were also noticed at the cultivated land and hill slopes. The Acheulian artefacts occurred in association with colluvium. These artefacts were made

on locally available quartzite and cherty quartzite. The tool assemblage included handaxes, cleavers, discoids, flakes and points. Late Stone Age sites, at Somgaon, yielded microliths made on quartz, chalcedony and agate, structures made of stone blocks arranged in the pattern of a house, were also noticed with the Late Stone Age tool assemblage. A large number of Acheulian artefacts were found to be scattered over barren land on the left bank of the Narmada, near village Mora.

The historical remains were noticed in the form of iron slags, Siva temple, *sad* stones, potsherds, brickbats and water tanks. Stray sculptures of Hanuman, Siva-*linga*, Nandi, Parvati, Vishnu, Parashurama, Narasimha, Bhairava and Karttikeya were also noticed at various places.

53. EXCAVATION AT BALWARA, DISTRICT EAST NIMAR.—In continuation of previous year's exploration *(1987-88,* pp. 47-57) in the submergence area of the Narmada Sagar Dam Project, S.B. Ota, assisted by S.K, Lekhwani, N.G. Nikoshey, N. Taher, K.M. Girhe, R.K. Dwivedi, Mala Ukey, N.K. Nimje, C.L. Yadav and P.C. Dogra of the Prehistory Branch of the Survey, undertook excavation of Late Acheulian site at Balwara (22° 10' 21" N; 76° 31' 11" E) 55 km from Khandwa, the tehsil headquarters, with the objective to ascertain the nature of the lithic assemblage and to understand the site formation process, as the site preserves excellent deposits for understanding the Quarternary history of the area in terms of palaeo-landscape and palaeo-environment.

The site, located to the west of the forest village settlement at Balwara, which is 2 km northwest of the village Purni, lies on the southern fringe of the Vindhyas overlooking the Deccan trap area. The Narmada flows about 5 km north of the site with the Vindhyan hills in between. The surface artefactual scatter at the site covers an area of about 500 X 300 m. It is an open air primary Acheulian site located on the pediment surface of the Vindhyas at an elevation of 800' from M.S.L. Sikandar nullah, a tributary of Pipalghati nullah, flows on the south and south-east of the site. There is a good vegetational cover of dry deciduous type on the northern and western sides of the site.

A trench measuring 5 X 5 m in size was taken for excavation. Micro-debitages from each level was recovered through wet sieving of the sediments. Apart from this, five test pits were taken at various points to ascertain the stratigraphical context of Late Acheulian industry, which occurred in association with a rubble horizon overlying a brownish grey to reddish colour sandy silt .sediments which are a pre-Acheulian formation. The average thickness of Acheulian horizon was found to be about 40 cm.

The stone tool assemblage was Late Acheulian and comprised of both heavy as well as light duty tools and large amount of simple artefacts. The heavy duty tools included cleavers, handaxes, choppers, knives, picks, large utilized flakes, etc., whereas the light duty tools comprised of variety of scrapers and utilized flakes. Of the handaxes and cleavers, frequency of cleavers was more than that of handaxes. Cleavers were both 'IT as well as 'V shaped with straight and oblique working edges. Handaxes and cleavers were mostly on flakes, thin, well retouched without cortex, and symmetrical in shape. Some of the artefacts exhibited reutilization mark.

Tools were mainly fabricated on quartzite, though tools made on chert were also met with. Most of the chert artefacts were highly weathered whereas the quartzite artefacts were fresh. Some quartzite artefacts were abraded because of their exposure on the surface.

Micro-debitages extracted from the site were extremely fresh and their frequency was very high, a fact pointing towards the site being of primary context From the nature of occurrence of artefacts and composition of assemblage the site can be treated to be a factory-cum-habitational area of Acheulian man.

54. EXPLORATION IN DISTRICT REWA.—Radha Kant Varma, Mahesh Srivastava and A.K. Singh of the Department of Ancient Indian History, Culture and Archaeology, A.P.S. University, Rewa, brought to light a rich plant fossil-bearing site, near village Patpara, about 80 km from Rewa, on the right bank of the river Son. The fossils were found in a hard and compact riverine deposit composed of sandy, silty calcareous material.

R.K. Varma, A.K. Singh, Mahesh Srivastava, Rashmi Singh and K.L. Agrawal also located a Siva temple at Rehi in a dense forest, 5Q km north of Rewa town. The temple has a low *jagati* and is *pancharatha* on plan. The total height of the temple is 5.80 m from the ground level, on plan, it consists of a sanctum sanctorum and an *antarala.* The *pitha* of the temple measures 3-20 m east-west and 3.10 m north-south. The *amalaka* and the *kalasa* of the *sikhara* are lost.

The *garbhagriha,* having low ceiling, is decorated with *vikasita kamala* motif. The central figure on the *uttaranga* is of Siva-Parvati sitting in *paryankasana* in *alinganamudra.* To the extreme right is the figure of Brahma sitting in *padmasana* and to the extreme left is the figure of Vishnu. The figures of *Navagrahas* are also depicted. Yamuna on the back of tortoise and Ganga on the crocodile are standing in *tribhangamudra* on the right and left, sides of the door-jamb.

One *deva-koshthaka* each is placed on the north, south and west sides of the temple. In the northern *deva-koshthaka* is placed an image of four-armed goddess, in *ardhaparyankasana.* The image of Surya, in *utkatasana* is on the northern side while images of Ganesa and four-armed Sarasvati arc on the western side. On stylistic ground the temple bears close similarity to Pratihara temple and can be dated between *circa* eighth-ninth century AD.

Ajay Singh, under the guidance of R.K. Varma surveyed the area around the rivers Behar, Kariari, Bichhia and Pakariyar, flowing through the district. The exploration revealed early historical sites, at Tikuri (near village Boda), Ajgarha, Itha, Bhirawa (near village Itha), Mankahari, Muriari, Dubgawan, (near village Muriari), Kithbariya, Dubaha, Khadda, Dhari, Moharawa I and II, Amar-kachh (near village Baraun) and Baraun, all situated on the river Behar. All these sites yielded burnt brick (measuring 36 X 26 X 6 cm and 47 X 30 X 7 cm) structures. At Baraun bricks of the smaller size (measuring 10 X 9 X 8 cm) were used for the construction purpose. The pottery from these sites were red, grey, black-slipped, degenerated type of NBP and black-and-red wares. Punch-marked and cast coins, both of silver and copper, were recovered from Itha, Bhirawa, Muriari, Dhari, Moharawa I and II and Amarkachh. The symbol found on some of these coins were taurine, hollow cross, tree in railing, elephant, *svastika,* Ujjain symbol, sub crescent on hill, *chakra,* etc. Terracotta figurines were recovered from Tikuri, Itha, Bhairawa and Muriari. The sites of the early historical period could be dated between the fourth century BC and third century AD.

Early historical sites were also noticed at Itha and Bhairawa, on the Pakariyar river; Laksh-manpur, Itahi, Teekar, Uncha, all on the bank of the Bichiya; and Bhirwa and Semarahai, on the bank

of the Bheraura Nala. Like the sites on the bank of the Behar, these sites could be placed within the time-bracket of fourth century BC and third century AD.

Mesolithic sites were located at Patpara Ghat Katki, on the bank of the Behar, Bankauiyan, Dadar Pahar, Baradaha and Kathar on the bank of the Kariari. All these sites yielded geometric and non-geometric tools, and were devoid of any ceramic evidence.

55. EXPLORATION IN DISTRICT SATNA AND SHIVPURI.—Prakash Kumar Tiwari, under the guidance of R.K. Varma of the Department of Ancient History, Culture and Archaeology, A.P.S. Uni versity, Rewa, noticed several sites of archaeological interest.

Mesolithic sites were noticed at Siddha Baba ki Pahadi (Banshipur), Gadhi Pahadi (Banshipur), Pipra and Mau, all on the bank of the river Tamas, near Maihar; Hinauti Ghat, Jawari Ghat, Tikuri (Pithaipur), Majhiyar, Jhanjhar. (Sattihaghat), Matehna Ghat, Chull Ghat, Morailaha Jhanjhar (Mugwari) and Pamariya (Ram Nagar), on the bank of the river Tamas on the Rewa-Satna road. The mesolithic site at Chuli Ghat yielded both geometric and non-geometric tools alongwith a large number of cores and waste materials. At Pamariya (Ram Nagar) the artefacts included black-and-red ware, iron implements, bangles, beads, etc. Here, eight megalithic (cist types) were noticed in an area of 200 x 100 m. The height of the cist varied from 1-10 m to 2-50 m with the radius from 1-35 m to 2-10 m.

Handaxes and cleavers on quartzite and microlithic implements were noticed at Karya-I, on the Ganesh Kheda road, 12 km south of Shivpuri, in district Shivpuri. Badkhera I, 8 km from Kolaras, in district Shivpuri, yielded a number of sea shell fossils.

56. EXCAVATION AT SODANGA, DISTRICT UJJAIN.—Rahman AH and Ashok Trivedi of the Department of Ancient Indian History, Culture and Archaeology, Vikram University, Ujjain, carried out excavation at Sodanga, 15 km to the north-west on the Ujjain-Unhel road, from where V.S. Wakankar, S.K. Shukla and M.L. Dalai had discovered, in 1965, an image of elephant having Mauryan polish. Subsequent survey of the area yielded the lotus capital of the Mauryan pillar, which strengthened the belief that the elephant figure found earlier was the crowning animal of the Asokan pillar, the shaft of which is untraced. Terracotta figurines of the Sunga period and defaced images of Jaina Tirthankaras, like Dharmanatha and Neminatha were also found from this place. Near the mound is a *sarvatobhadrika* and a step-well situated close to the mound, datable to the Mauryan period.

The mound, hemispherical in shape, was taken up for excavation and a semi-circular stone-wall unearthed, the foundation of which was traced to the depth of 3 m. Mauryan bricks were used over the wall to construct some sort of surface. A stone pit, facing south, to the south of this wall, was noticed.

The sequence of occupation at the site was tentatively divided into following periods:

Period I (Pradyota-Maurya period, *circa* 600 BC to 200 BC): It was characterized by the occurrence of plain pottery, fine varieties of NBP ware, red ware, Mauryan bricks and the stone wall mentioned above.

Period II (Sunga, Kanva and Satavahana period, *circa* 200 BC to AD 75): NBP and red ware continued in this period. Some terracotta figures were also recovered.

Period III (Kshatrapa-Satavahana period, *circa* AD 76 to AD 300): The period yielded red polished ware, showing affinity with Roman-Samian wares, spouted vesels, potsherds with engraved Brahmi letters, coins, inscribed seals, beads, iron and shell objects.

Period IV (Gupta, Aulikara and Huna period, AD 300 to AD 600): The period yielded red polished ware alongwith some pieces of NBP ware, iron and shell objects, and die. Thick deposit of ash was noticed on the entire mound and it seems that the site was perhaps destroyed in the sixth century by the Huna invasion.

MAHARASHTRA

57. EXCAVATION AT DAULATABAD, DISTRICT AURANGABAD.—In continuation of the previous year's work *(1987-88,* pp. 82-83), P.N. Kamble, assisted by D. Hanumant Rao, M.R. Dhekane, Ajitkumar, D.N. Sinha, S.L. Jadhav, D.T. Asar, D.L. Sirdeshpande, R.D. Ingale and G.L. Gaikwad respectively, resumed the excavation at Daulatabad to understand the settlement pattern by exposing the remains of the medieval period.

The excavation of this season brought to light structural remains of various types. The houses were found having fine plastered floors, niches and rubble stone courtyard. Remains of terracotta tiles suggested their use in the roofs of the house. The houses had small room, kitchen, toilet, big courtyard, etc. A small kitchen room, facing south, was exposed in one of the houses on the outer portion of which was found a stone quern kept over a platform. In another house, a big courtyard and common toilet were, exposed on the extreme north side of the excavated area. The soak-pits and an outlet to drain out water was also found in this house. Structural remains of houses attached with common toilets were exposed in quite a few trenches.

Of the structural remains, a small kitchen room with stone quern, cooking platform, etc., is very interesting. This small kitchen had a courtyard to the west, the floor of which was also plastered. The northern enclosure wall of the courtyard had a small niche.

Another important structure exposed was a water-tank constructed at a level higher than the other structures, perhaps for distribution of water to the quarters or residential houses. The water tank was probably covered with wooden cover as is the system prevailing at present as well. The interior of the water tank was well plastered and at the bottom a hole was provided perhaps for lifting water through earthen pipes.

The antiquities recovered so far, included copper coins of the Indo-Islamic period, rings, seals having legends in Persian and Arabic, arrowheads and knives, terracotta figurines, lamps, smoking pipes, lime boxes, toys, bangle pieces, Chinese porcelain, iron hook, door, latches, glass and stone balls, etc.

The ceramic industry is represented by red slipped ware, local glazed ware, Chinese procelain, celadon ware and other common types of medieval pottery. Among the shapes mention may be made of storage jars, bowls and dishes.

58. EXPLORATION IN DISTRICT BEED.—S.L. Jadhav of the Aurangabad Circle of the Survey noticed following sites of archaeological interest in Georai Taluka during the course of village to village survey:

Taluk	*Village/Sites*	*Nature of remains*
Georai	Aher Vahegaon	Stone mill *(ghani),* large cellar, granary, etc.
-do-	Bhadangawadi	Mutilated sculpture of goddess
-do-	Chikli	Stone mill *(ghani)*
-do-	Dharvanta	Medieval pottery, bone bangle pieces, bastion and stone mill
-do-	Erandgaon	Old stone mill *(ghani)*
-do-	Kajala	Stone mill *(ghani)*
-do-	Khadki	Stone mill *(ghani)*
-do-	Kolegaon	Late medieval Siva temple, having Marathi inscriptions in Devanagari on pillar (not legible), loose sculpture of Khandoba and goddess
-do-	Lodatgaon	Siva-*linga* and sculpture of Ganesa
-do-	Madalmoi	Step-well, sculptures of Vishnu, Rama-Lakshmana and Sita, Durga, etc. and graves
-do-	Manmodiwadi	Embankment and late medieval temple of Khandoba
-do-	Mathuri	Graves on the hill
-do-	Padalsingi	Late medieval Siva temple
-do-	Phulsangvi	Khandoba temple, hero stones, etc.
-do-	Pimpalgaon	Hero stone
-do-	Pokhari	Hero stone and stone mill *(ghani)*
-do-	Saidapur	Copper plates and stone mill *(ghani)*
-do-	Sangam-Jalgaon	Old ruined temple .of Siva, stone *lingas* and medieval *gadhi*
-do-	Shekta	Late medieval Siva temple
-do-	Sindkhed	Late medieval Durga temple and sculpture of Mahishasuramardini
-do-	Susi	Stone mill *(ghani)*
-do-	Tandla	Ruins of Siva temple, hero-stones and stone mill *(ghani)*
-do-	Takalewadi (Rudra's-wadi)	Stone wheel of bullock-cart
-do-	Tintarvani	Hero-stone

Taluk	*Village/Site*	*Nature of remains*
Georai	Ukkadi-pimpari	Hero-stones, stone mill *(ghani)* and stone wheel of bullock-cart
-do-	Wadgaon-Susi	Stone mill *(ghani)*

59. EXPLORATION IN DISTRICTS DHULIA, JALGAON AND NASIK.— In the course of exploration in the area coming under submergence due to irrigation projects, Ajit Kumar of the Aurangabad Circle of the Survey noticed following sites of archaeological interest:

District	*Taluk*	*VillagelSite*	*Nature of remains*
Dhulia	Nandurbar	Bhandarpada	Mound yielding early historic and medieval pottery
-do-	Shahada	Vadgaon	Mound yielding early historic and medieval pottery medieval pottery
-do-	-do-	Vaghoda	Ancient mound with Jorwe, historical and medieval pottery, grooved tiles with holes belonging to the early historic period
-do-	Sindkheda	Wadi	Stone rubble and mud fortification, microliths, mound yielding Jorwe and early historic pottery
Jalgaon	Chopada	Malapur	Ancient mound, mud fortification and early historic pottery
			Mound with early historic pottery
Nasik	Nasik	Dabargaon	Mound with early historic pottery
-do-	-do-	Dahandegaon	Mound with early historic pottery
-do-	-do-	Dahigaon	Ancient mound having brick structure
-do-	Shahada	Javada	with brick size 39 X 22 X 8 cm; early historic and medieval pottery; Siva temple datable to eighteenth century
-do-	Nasik	Nikware	Mound yielding early historic to medieval pottery, iron sword hilt and Nandi image in front of *linga,* datable to the 17th century AD
-do-	-do-	Pimpalwadi	Mound yielding early historic pottery
-do-	-do-		
		Sadhagaon	Mound yielding early historic pottery

60. EXCAVATION AT MULCHERA, DISTRICT GADCHIROLI.—In continuation of the previous year's work *(1987-88,* p. 84), A.P. Jamkhedkar and Verulkar, assisted by Bansod and Bhoir, of the Department of Archaeology and Museums, Maharashtra, resumed the excavation at Mulchera (80° 01' N; 19° 41' E) with the objective to understand the exact nature of the structure, partly exposed during the last season and thought to be a stupa. This season's work made it clear that the said remains belonged to a temple.

The structure, oblong on plan, measured 6-40 m at its longer axis in NS direction and 2-60 m in the EW direction. Around this structure were found a number of walls forming boxes. The overall thickness of the wall was 65 cm with *murum* mixed with lateritic soil. The main oblong structure was also filled with the same material. Approach to the main structure was from the east. The steps of the earlier period, provided to reach the entrance, were covered with earth and *murum* at the later period to prepare a ramp.

The entire structure stands on a well-rammed foundation. The area was first rammed properly, over which stone, rubble-pebbles and chips, were laid evenly. There seems to have been cyclopean wall around the structure meant for protection.

Stamped red ware, plain red ware and black ware, iron nails, roof tiles, a coin bearing letters in Brahmi characters and copper objects used in worship were found during the course of excavation. The structure seemed to be a temple built during the late Satavahana period which continued to be used in early Vakataka period.

61. EXPLORATION IN DISTRICT NAGPUR.—Amarendra Nath, assisted by S. Pratapachandran and N.C. Prakash of the Excavation Branch I of the Survey explored the region along the Sur river, a tributary of Wainganga, and brought to light the following sites of archaeological interest:

Site	*Taluk*	*Nature of remains*
Kodamedhi (21° 19' N; 79° 29' E)	Ramtek	Mound bearing microliths, parallel-sided blades, points, crescents, scrapers and cores of chalcedony, agate, quartz and chert.
Sirkanda ((21° 17' N; 79° 31 E)	Ramtek	Elliptical mound (approx. 200 X 150 m) yielding black-slipped, plain and painted varieties of red ware, black-and-red ware and micaceous red ware. The painted designs included hatched diamonds, combed pattern, and group of vertical strokes in varying numbers, some sherds also had graffiti marks. The main shapes included vases, bowls, dish, lid, platter etc. Some early historic red ware bore series of oblique notches over an applique hand. Iron

Site	*Taluk*	*Nature of remains*
		point, hopscotches made on potsherds, stone muller of double bell type, white stone, micro-liths on chert, chalcedony and quartz were the antiquities collected from the site.
Wakeswar ((21° 18' N; 79° 30' E)	-do-	Medieval temple enshrining Sapta-matrikas panel, consisting of *nirandhara* sanctum and *mukhamandapa.* The *panchasakha* door and other mouldings of the temple indicated the temple to be the work of tenth-eleventh century AD. Remains of earlier brick structure, perhaps of a temple, were also noticed on the surface.
Dongar Manda	Kuhi	Cairn circle, having diameter of 12.15 m.

62. EXCAVATION AT ADAM, DISTRICT NAGPUR.—Amarendra Nath of the Excavation Branch (I), Nagpur, of the Survey assisted by S.N. Raghunath, K.P. Rao, S. Pratapchandran, N.C. Prakash, N.K.S. Sharma, R.K. Roy, M.U. Qureshi, Mohinder Singh, S.V. Sutaone, P.M. Bhope, H.J. Bara-patre, D.K. Kasbi, A.U. Ganar, Shahid Akhtar, Sultan Singh and Ku. Indira S. Pande, excavated the site at Adam ((21° 00' N; 79° 27' E) situated on the left bank of the Waghor of the Wainganga drainage system *(1975-76,* p. 36; *1987-88,* p. 85). The site is situated about 60 km south-east of Nagpur. The site measures approximately eight hundred metres east-west and five hundred metres north-south and rises over a height of eight metres from the surrounding plains. Altogether, three trenches, one each at the centre of the mound (pl. XXI) and across the rampart and the moat (fig.8) and the mound considered to be stupa were taken up with the objective to ascertain (i) the culture sequence and chronology of the site, (ii) its interrelationship, if any, with other contemporary cultures of the region, (iii) the nature and formation of the stupa, rampart and the moat, and (iv) to understand the settlement pattern within the rampart. The excavation revealed a fivefold cultural sequence.

Period I was represented by fifty cm thick deposit, lateritic in origin, composed of reddish brown compact earth mixed with grit and rarely with charcoal-bits and bone (pl. XXII). It yielded below the pre-defence levels microlithic industry, free from pottery, represented by parallel-sided blades, lunates, points, flake blades and scrapers made of chert, chalcedony, agate and quartz (fig. 9). Tentatively, the period has been dated between *circa* third and second millennuim BC.

Period II, has been termed as 'Vidarbha Chalcolithic' as the ceramic industry of this period did not correspond either in form or in description with any of the contemporary chalcolithic cultures of the regions adjoining Vidarbha. The deposit, approximately one metre in thickness, belonged to one compositional class of clayey earth, varying in colour from dark-brown to pale-brown, with an admixture of grit and charcoal bits. There were noted as many as six pottery types from medium to coarse fabric, invariably of inadequate firing. The types were (i) red ware with a chocolate slip and

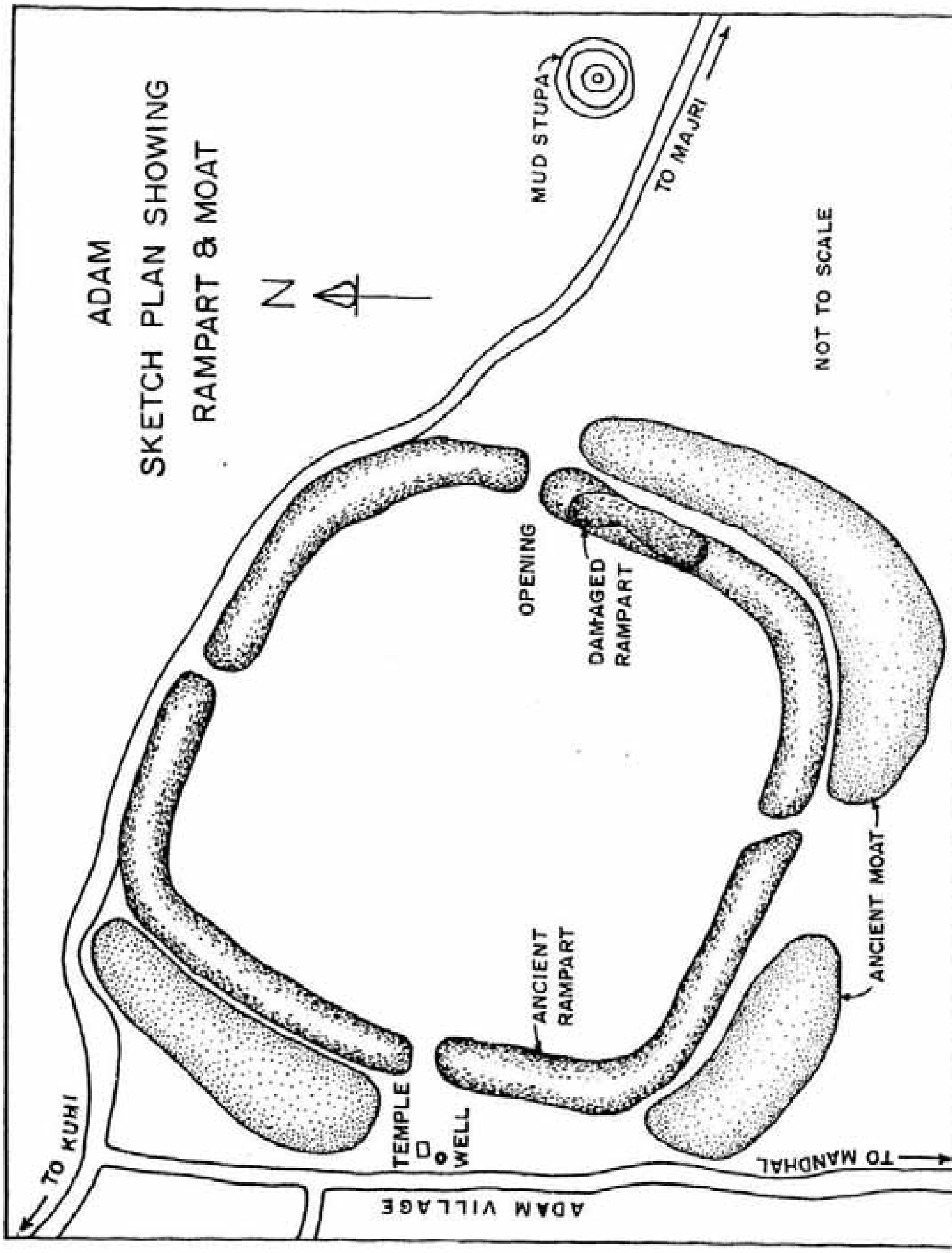

ADAM
SKETCH PLAN SHOWING
RAMPART & MOAT
N
MUD STUPA
TO MAJRI
NOT TO SCALE
OPENING
DAMAGED
RAMPART
ANCIENT
RAMPART
ANCIENT MOAT
TEMPLE
WELL
TO KUHI
TO MANDHAL
ADAM VILLAGE

Fig. 8

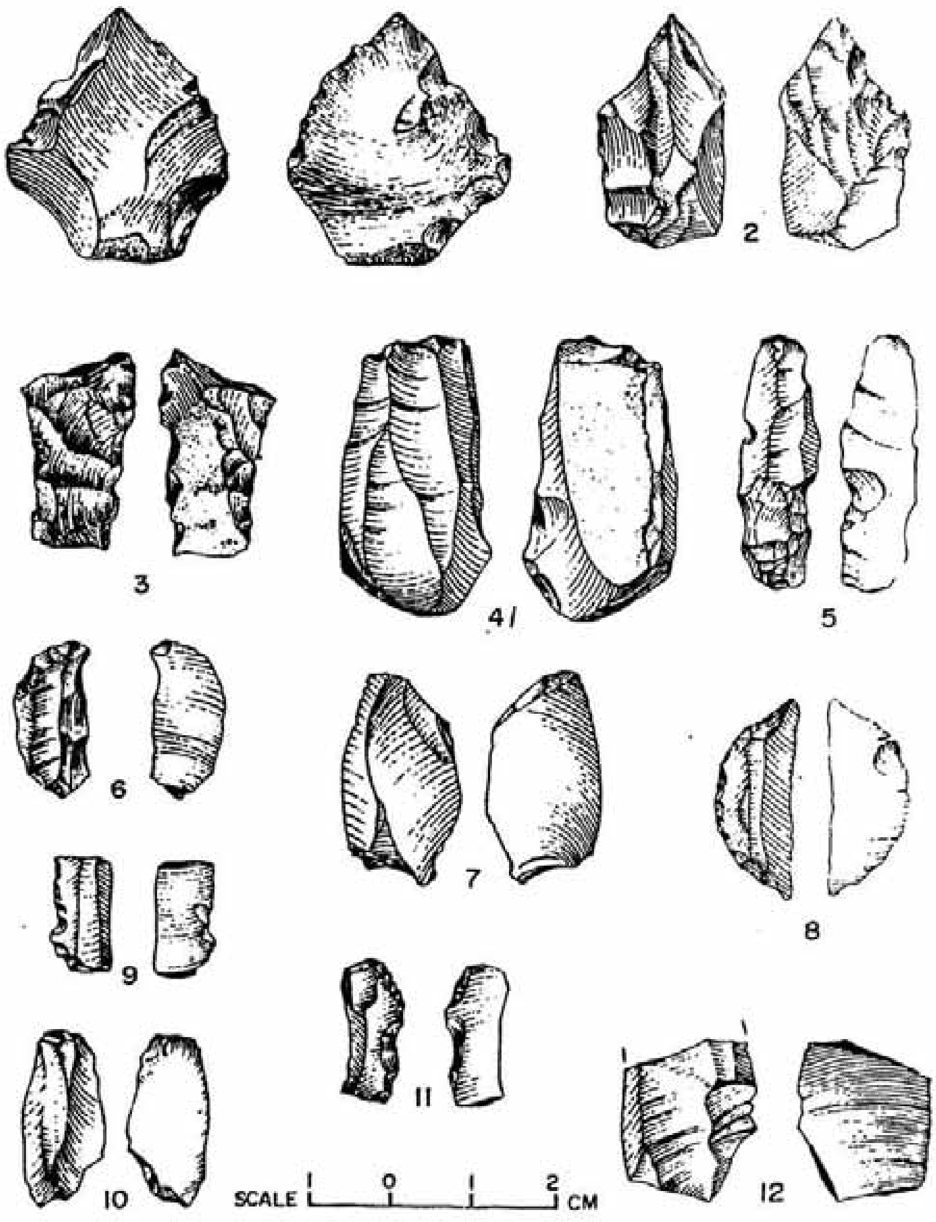


FIG. 9. *Adam: microliths, Period I*

painted in white, (ii) red ware, with a red slip and painted in white, (iii) red ware with a red slip and painted in black, (iv) unslipped red ware with painting in black, (v) unslipped red ware with painting in white, and (vi) black-and-red ware with red slip and painted in black. The painted designs on them were limited to (i) hatched diamonds, (ii) comb pattern, (iii) series of short horizontal wavy strokes ('Z' pattern), and (iv) group of vertical strokes of varying number occurring both externally and internally on the rim (fig. 10). Among the plain pottery an average of about 64% constituted red ware while 26% formed black-slipped ware and 10% black-and-red ware.

Evidence of structures in the form of post-holes and mud-floors was noticed, but due to the limited area no complete plan could be ascertained. A semi-circular house plan had post-holes spaced at regular intervals of fifty cm along the perimeter of the rammed-mud floor. At another place floor with post-holes was also noticed where a whet-stone was found. Slightly above this floor was exposed a burnt clay floor patch over which was noticed a polished celt-like object in shale stone, perhaps used as a scraper. Other than the neolithic celt reported earlier *(1975-76,* p. 36), the present excavation did not yield any similar examples from the chalcolithic horizon; the microlithic industry of the preceding period however continued thus indicating a chalcolithic stage in the archaeological chronology of Vidarbha. The other finds of the period included a copper ring, circular in section, a crucible, bone stylus of cylindrical shape with an oblique cut end, and an engraver with finely finished pointed end. The period has roughly been dated to the first quarter of the second millennium BC.

Period III was characterized by the introduction of iron; however, the traits of the preceding period continued to occur. The layers assigned to this period belonged to one compositional class of ash-deposit occasionally mixed with soft clayey earth and charcoal-bits. But for the slight increase in frequency, the painted pottery of earlier period continued with the addition of a few new designs. A notable introduction was that of the coarse micaceous red ware painted with thick brush over a chocolate-slipped base. The other new design-elements met with were (i) chequer-board pattern, and (ii) series of horizontally, occasionally obliquely inclined coma-like strokes or dots arranged vertically (fig. 11). The horizontally or obliquely inclined coma-like strokes were noticed in red ware painted sometimes in white or black; occasionally, the strokes painted in black occur on the base of some table wares like dish or bowl. Towards the later phase of this period, the frequency of white painted pottery got reduced as compared to the black on red ware. Some of the Black-and-red pottery of this period bore graffiti marks, comparable to those found in the protohistoric context In the lower phase, the percentage of plain pottery noted were: red ware 59%, black-slipped ware 32%, and Black-and-red ware 9%. Towards the upper phase, the red ware continued to dominate with 64% while the Black-and-red ware showed a marked increase of 23% and black-slipped ware declined to 13%.

Traces of structure in the form of post-holes and semi-circular mud-floor were noticed. A pot-burial in upright position, of secondary nature, was noticed in the habitation area (pl. XXIIIA). The medium-sized vase of red ware contained a deep bowl of Black-and-red ware filled with soiled charcoal and earth.

The introduction of iron made copper a subordinate metal at Adam. The artefacts in iron included a tanged point and nail fragments and indeterminate and rusted pieces. Other important

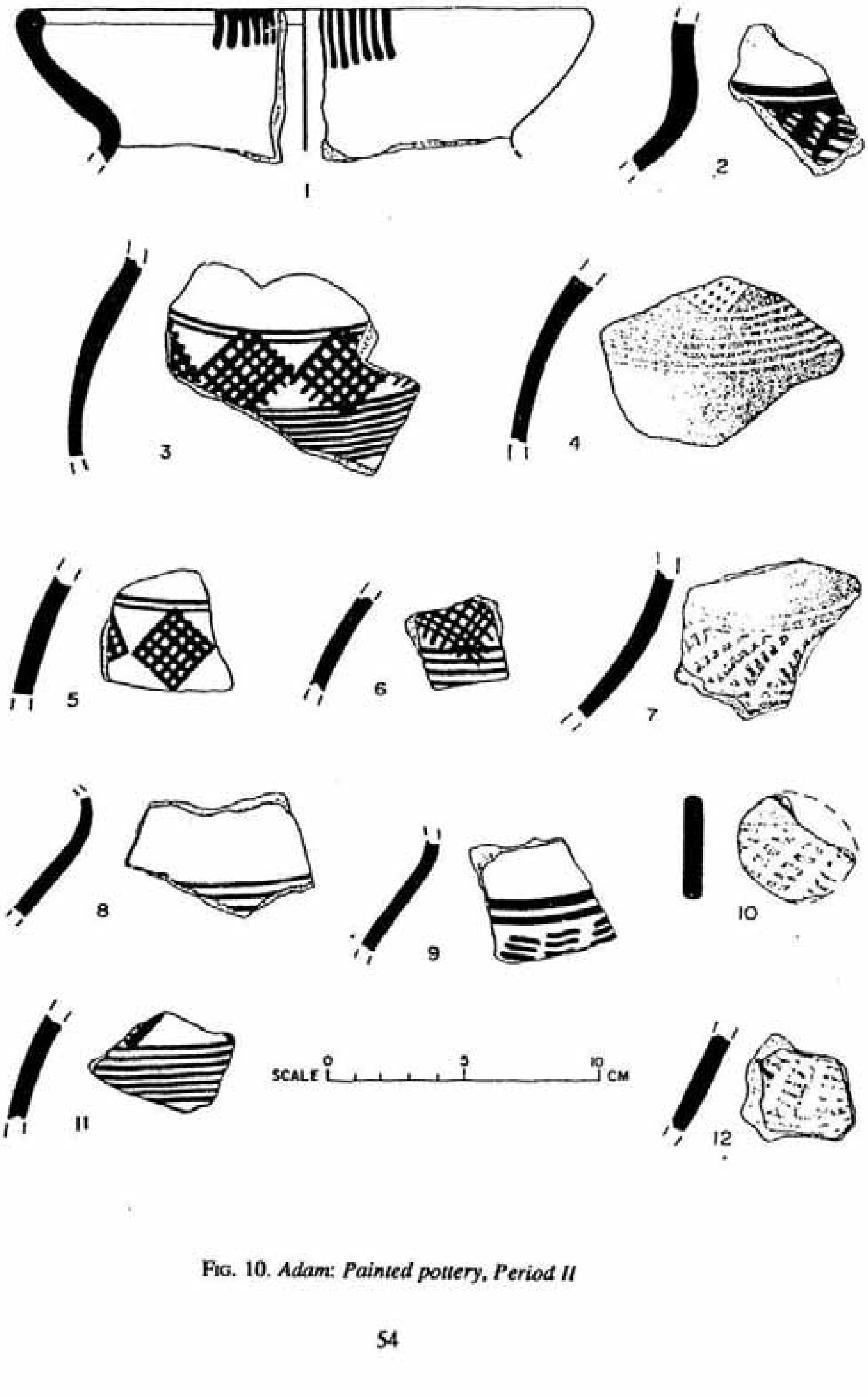


FIG. 10. *Adam: Painted pottery, Period II*

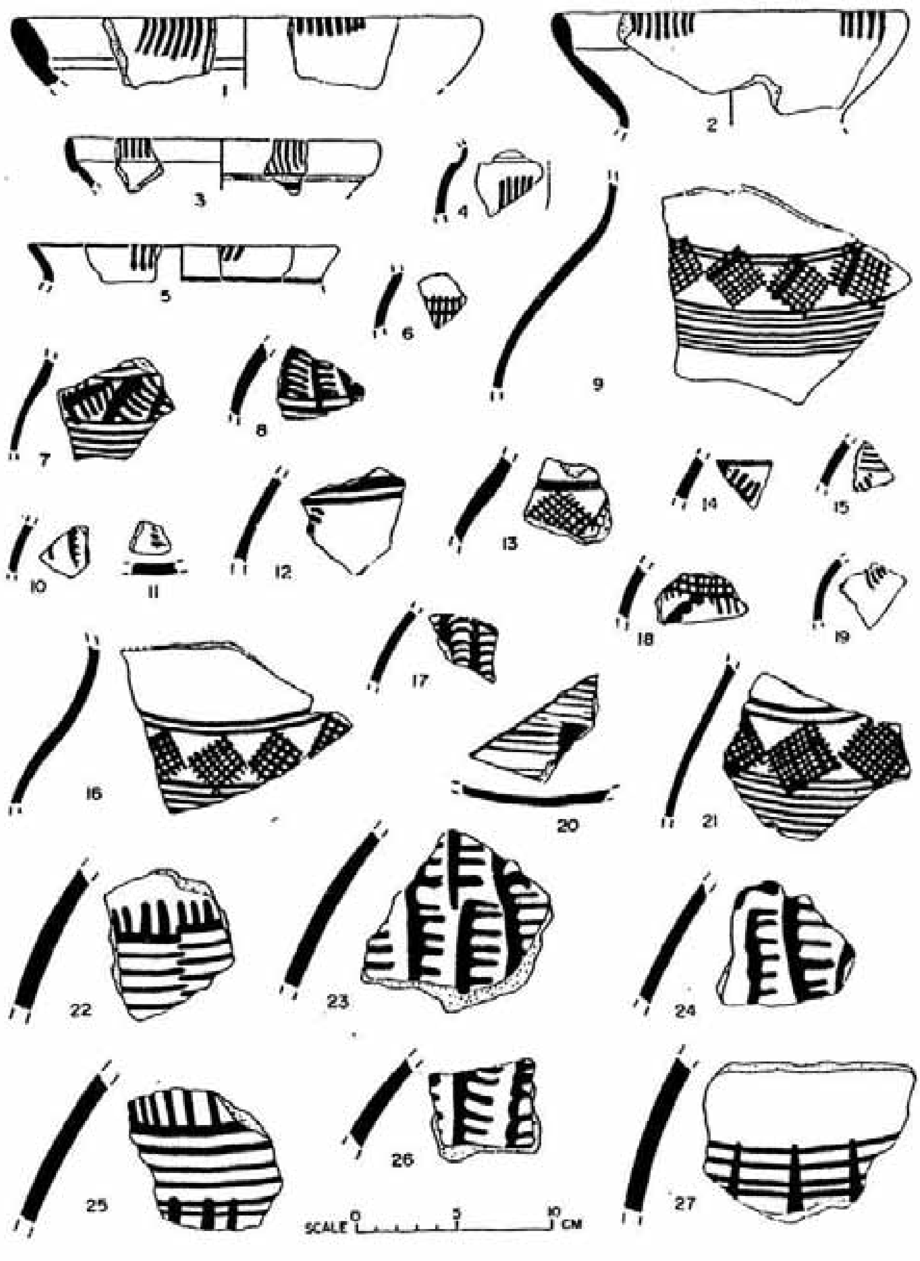


FIG. 11. *Adam: Black-painted pottery, Period III*

antiquities reported from this period were copper ring, short barrel-shaped carnelian bead etched with dots, annular terracotta beads, hopscotches dressed in pottery and stone, terracotta head of a bird and oblong-shaped spool, bone points and stylus and a shell bangle fragment. Tentatively, the period has been assigned between *circa* 1000 BC and 500 BC.

Period IV, termed as pre-Mauryan and Mauryan, withnessed some fundamental change in the cultural content, perhaps due to the developed iron technology. An abrupt transformation, in the total outlay of the house plan from circular or oval to square or rectangular and use of stone, brick and tiles as building materials indicated a departure from the rural to urban settlement pattern. The deposit consisted of light brown earth of medium compactness, occasionally ash mixed with streaks of *murrum.* The ceramic industry was represented by micaceous red ware and the Black-and-red ware of medium to coarse fabric, generally associated with the NBP ware. The micaceous red ware was painted with linear bands of varying thickness below the neck. The types met with were vases, jars and bowls. The Black-and-red ware bowl with a featureless rim, occasionally out-turned and slightly expanding sides and carinated to flattish base was an important type. The frequency of red ware (73%) was more than that of the Black-and-red ware (27%). No complete house plan could be exposed; however, in one of the cuttings (Bl) an undressed shale stone wall running east-west (8 x 0-80 m)was noticed with a right angle to the north (2 X 0.50 m). It had mud flooring. In the stone-mud-masonry were noticed occasionally brickbats and fragments of tiles which suggest the existence of brick structure and of tiles for roofing. The other structure was in the form of a fine *murrum* floor, rectangular in shape, with post-holes of 15 cm diameter. The available extent of the floor was 3-85 x 2-25 m.

The outstanding discovery of this period were the fragmentary legged querns and mullers in sandstone with typical Mauryan polish. Two of the legged querns were engraved towards the shorter axis with auspicious symbols like *svastika, nandipada* (taurine) and *mina* (fish). However, these have been reported from the rampart cutting. The other antiquities of this period included beads of crystal, agate, carnelian and terracotta; amulet and ring; iron arrowhead; and engravers both of bone and antler. Terracotta fragments of hand-modelled female figures of 'ageless' mother goddess types with wide open legs shown without toe details were also recorded from this period. The period has been assigned date between *circa* 500 BC and 150 BC.

Period V, attributed to the Bhadras, Mitras, Satavahanas and Maratha rulers on the basis of numismatic and epigraphical evidence. The deposit belonged to one compositional class of clay, medium to hard in compactness and dark brown to black in colour. With the exception of grey and kaolin wares, the ceramic industry predominantly remained confined to red ware of medium to coarse fabric. The shapes included bowls, basins, dishes, jars, vases, lids and lid-cum-bowls. Devoid of paintings, the red ware had occasionally red slip on the exterior, and at times jars and basins were either treated externally with mica dust or it formed part of clay paste. Decoration on the pottery was introduced in this period by way of stamping, incision, pinch, cording, applique, etc. Of all the decorative elements, *triratna* of different types, rosettes, svastika, birds, hollow roundels and herring-bone pattern were common (fig. 12). Spouts of plain and decorated varieties were also encountered.

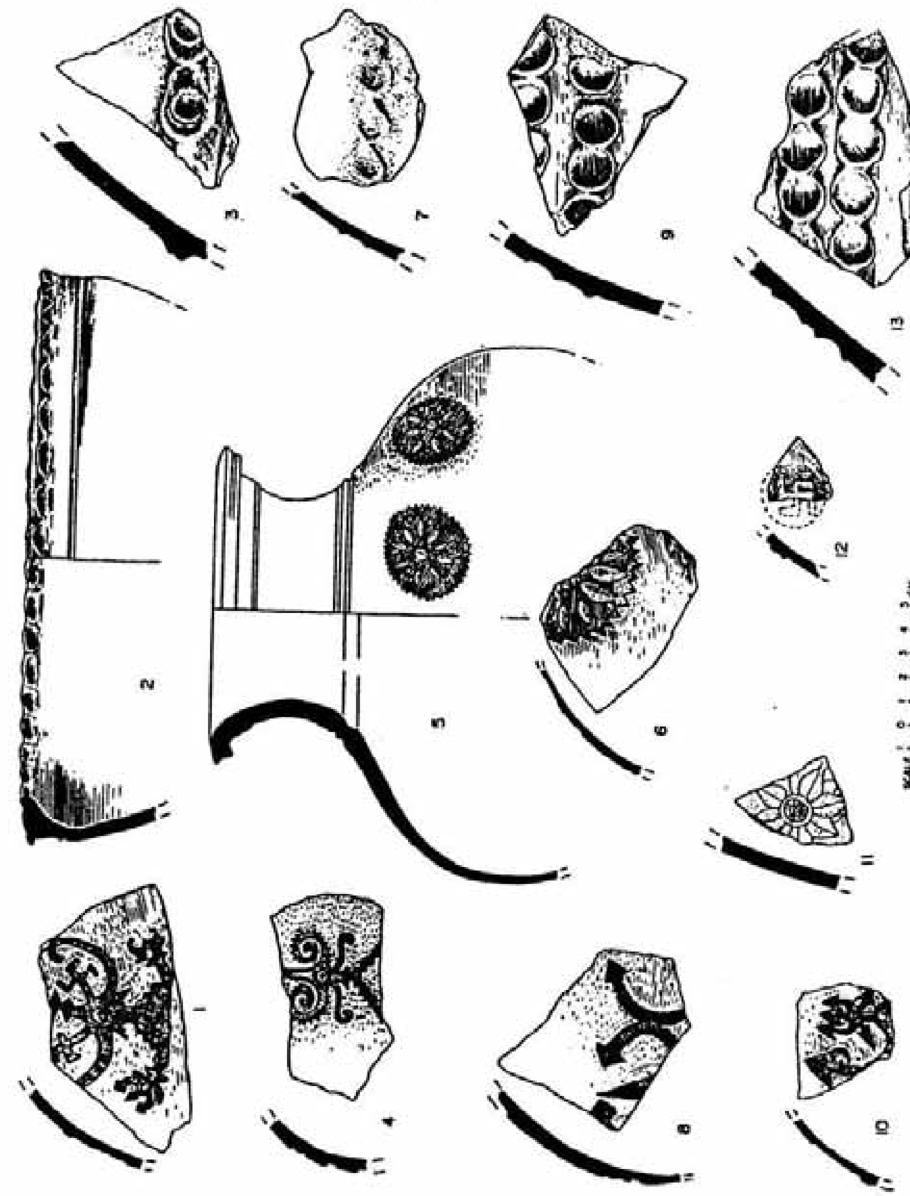


FIG. 12. *Adam: decorated pottery, Period V*

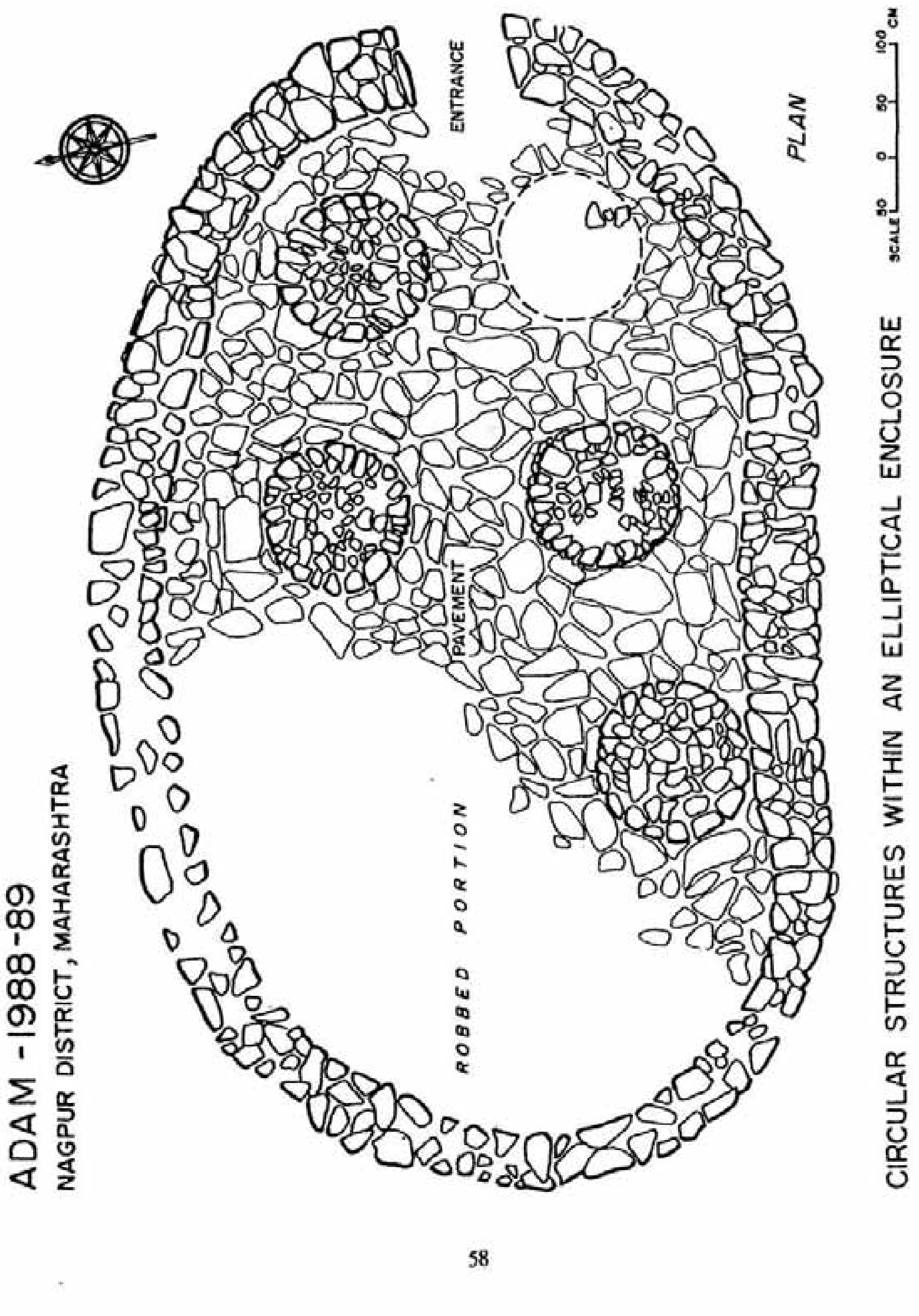

ADAM -1988-89
NAGPUR DISTRICT, MAHARASHTRA
ENTRANCE
PAVEMENT
ROBBED PORTION
PLAN
SCALE 50 0 50 100 CM
CIRCULAR STRUCTURES WITHIN AN ELLIPTICAL ENCLOSURE

Fig. 13

Both shalestone and brick structures were known to the people though the former material was preferred because it could be locally quarried. The burnt brick structures, worth mentioning, included a three-coursed wall, running north-south with a door opening (80 cm) and postholes (dia, 35 and 25 cm) cut into the wall. The stone structure was in the form of a compound wall of elliptical shape (fig. 13), with an entrance towards the east, encircling four circular structures perhaps memorial or votive in nature. Outside this complex, specially towards east, remains of several burials purely of secondary nature were noticed.

Different types of burials viz. (i) pot burial, (ii) terracotta ring burial, and (iii) pit burial, including their sub-types were noticed. In case of pit burial, pits of oval (pl. XXIIIB) and circular shapes of varying depths, occasionally lined with stones, were noticed. The pottery found in the burials included bowls, basins and vases of medium size, invariably battered, without following any uniform pattern.

In case of pot-burials, bowls and vases were laid independently to form the burial chamber inside a pit of required shape and size. The bowls of red ware with featureless rim, oblique sides and string cut base were used frequently, at times placed upside down with stone lining, at times one covering the other, or one above the other in inverted position. Another variant noticed was that of vases of varying shapes and sizes. A wide-mouthed vase with out-turned rim and slight carination was noticed in a circular pit kept in upright position; it was covered with a chamfered base of micaceous red ware, thin in section. The pot contained soiled charcoal bits mixed in earth with fragments of bone (?). A hopscotch was found from the pot-chamber. Another complete medium-sized vase, exterior stamped with *tri-ratna* motif, was found in the chamfered base of a thick micaceouos red ware jar, the collared rim of the same formed a ring around the said pot-chamber which contained charcoal bits mixed in earth. Out of the five terracotta ring-burials excavated at the site, two were cut across to study the contents of the burial. One of them contained in the centre a red ware vase of medium size, completely battered perhaps for ritualistic reasons (pl. XXIV). Hopscotch as grave goods was noticed invariably in all the types of burials.

Of all the antiquities, the most outstanding was a sealing bearing the legend *Asaka Janapada;* the other was that of an etched carnelian bead depicting a bull before a tree within railing. In all, two hundred and sixty-three coins were recovered from the site out of which, twelve were silver-based punch-marked coins, one hundred sixty-seven of copper, eighty-three lead, and one of brass. Among inscribed coins, significant were Bhadra, Mitra, Maharathi and Satavahana coins from stratified deposits. The lead portrait coins of the later Satavahana rulers were unique. Both handmade and moulded terracottas, such as human and animal figurines, votive tanks, spindles and wheels and crucibles were recovered. Other antiquities included four decorated ivory pendants (fig. 14); four hundred and eighty-six beads in terracotta, glass, bone, ivory, copper, agate, carnelian, chert, chalcedony, etc.; two multigrooved sandstone slab fragments of bead polishers; lead spools; copper pendants; and copper implements; iron objects viz. ploughshares, chisels, knives, arrowheads and an intact shear. The period has been dated from *circa* 150 BC to AD 200.

The cutting across the rampart and moat revealed different phases of construction of the rampart.

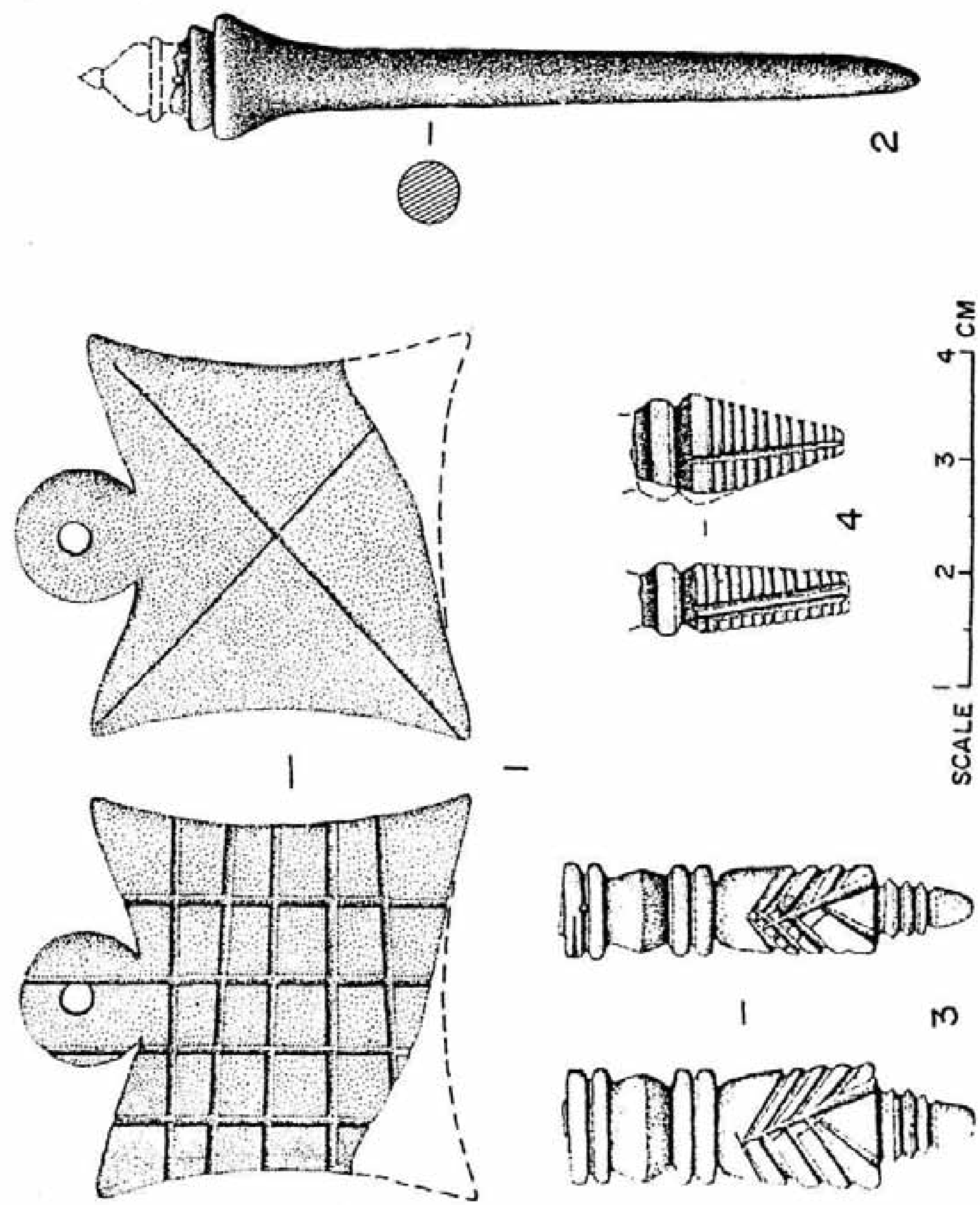


FIG. 14. Adam: ivory objects, Period V

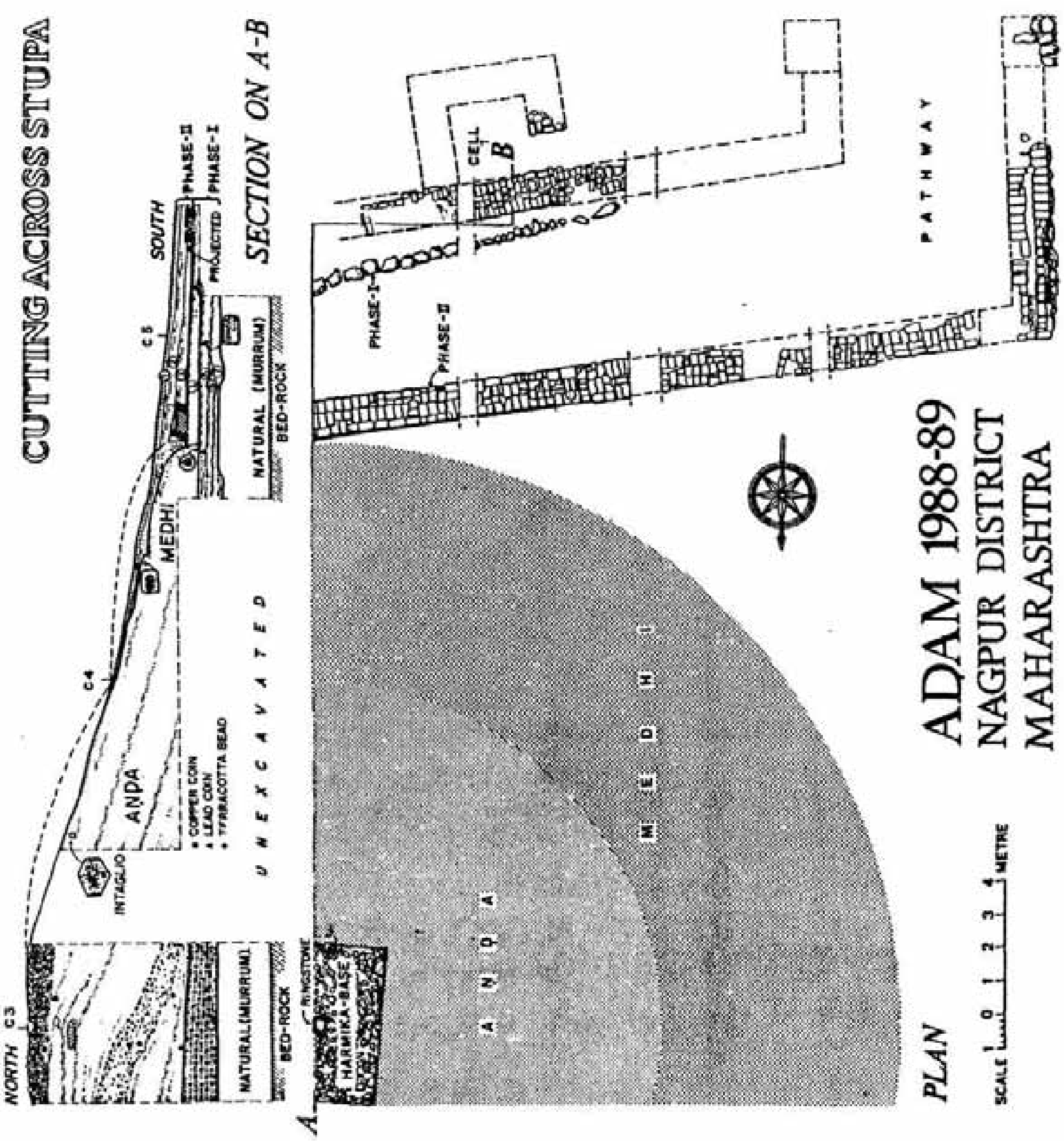

CUTTING ACROSS STUPA
SECTION ON A-B
NORTH
C3
C4
C5
SOUTH
INTAGLIO
ANDA
MEDHI
• COPPER COIN
• LEAD COIN
• TERRACOTTA BEAD
UNEXCAVATED
NATURAL (MURRUM)
BED-ROCK
PHASE-II
PHASE-I
PROJECTED
RINGSTONE
HARMIKA-BASE
A
B
CELL
PATHWAY
ANDA
MEDHI
PLAN
SCALE 0 1 2 3 4 METRE
ADAM 1988-89
NAGPUR DISTRICT
MAHARASHTRA

Fig. 15

It was believed that the iron-using people raised a low rampart and dug a small moat around their settlement; it was subsequently reinforced by a stone battlement perhaps coated with mud plaster. As per the requirements of defence the rampart was raised in subsequent periods resulting into the expansion of the size of the moat. In this process, the earth and *murrum* dumps of the rampart went on encroaching the habitational area within. Towards the counterscarp of the moat cutting a V-shaped ditch was cut in the bedrock which either served as silting channel or defence against intruders.

ADM-2, locally known as Devi hudki, contained the remains of a stupa. In order to understand the general plan of the stupa, trenches were laid on the southern half of the stupa. It was noticed that the earthen stupa was built over made up earth in two distinct phases of construction. Circular on plan, the stupa consisted *of medhi* (radius 17.30 m) and *anda* (radius 10.30 m) which tops the basal remains of square *harmika* (3.50 m) built out of random rubble; in its centre was noticed a ring-stone once supporting the *yashti* of a *chhatravali.* A shaft was cut in centre of the *harmika* but it did not yield any object. After a more or less uniform basal treatment of clayey soil, the earth of habitational deposit, *murrum,* rubble, stone chips, sand, etc., were heaped up without following any uniform pattern of dumping. After the formation of circular *medhi* in stepped fashion, the core of the *anda* was reinforced with heavy duty rubbles of uneven sizes, which was ultimately covered by earth and *murrum* to form a hemispherical dome. The surface of the stupa was treated with rammed *murrum* in order to defuse the periodical erosion. Assigned to Period V, the stupa of Phase I was built over layer (5), whereas towards the later phase restoration took place on the top of layer (4). In earlier phase, the L-shaped pathway (9.80 X 0.40 m) leading to the stupa was demarcated with a single coursed shale stone wall whereas in the later phase the same was indicated by brick wall (22.20 X 1.20 m); mud mortar was used in both the phases. The inner width of the pathway was 4.90 m (fig. 15).

But for one unique etched carnelian bead as noted above, the rest of the antiquities reported from the Stupa site are generally known in Period V of the habitation area (ADM 1).

Both punch-marked and inscribed variety of cast copper and lead coins were reported from the deposit which help in assigning the Stupa to the beginning of the Christian era.

63. EXCAVATION AT TER, DISTRICT OSMANABAD.— In continuation of previous year's work *(1987-88,* pp. 87-88), A.P. Jamkhedkar and K.D. Kawadkar, of the Department of Archaeology and Museums, Maharashtra, assisted by Chetan S. Sali and A.S. Pathak resumed excavations at Ter (76° 12' 30" N and 18° 19' 20" E).

Ter was one of the famous trade centres in western India, the antiquity of the region dating back from the Satavahana period. Excavation was taken up in the area marked as S.No. 406/1 and 406/2, from where an inscribed pillar was found in 1986 while ploughing. Taking the clue from the inscription, excavation was carried out. The site is located two and half km south-west of village Ter, 1875 m north of the river Terna and 20 m above the river bed. The area is presently under cultivation. The area selected for the excavation measured 120 m x 40 m, longer axis being on E-W direction.

Two distinct constructional phases were exposed in this excavation. The earliest construction was found at a depth of one metre and the later was found at a depth of 30 cms. Both the constructions are alike in material and style of construction. In both cases, stone boulders, rubbles, chips and sand were used for foundation and burnt bricks for the superstructure. The earlier one was disturbed for some unknown reason and immediately the later one was constructed over it by dumping the earlier material *in situ*. The plan of the structures belonging to both the phases could not be ascertained due to their disturbed nature. It seems that the structures had an aspidal plan. Few ovoid pits were observed in the earlier structure which were possibly, meant for the pillars.

A limestone sculpture of a male (34 X 17 X 10 cm), in full relief was found in layer one and is later. He is showing wearing a *dhoti* tied with plain square band and adorned with necklace, ear ornaments and a flat headgear. The proper right hand is akimbo while the left touches the crest of the forehead band, apparently decorated with incised diamonds. The figure is provided with a 3 cm high pedestal. The sculpture is somewhat crude. Similar type of representation in kaolin and terracotta, were reported in large numbers from this site.

A broken 1.10 m high limestone pillar, retangular (44 X 34 cm) in section, was found embedded in trench C 4. Upper end was decorated with half lotus and one of its sides showed the decorated motifs having criss-cross design. Both the ends of the pillar were flat, it was decorated with the criss-cross design.

From the area marked 406/1, a small rectangular brick structure having single layer of bricks was exposed. The purpose of the structure could not be ascertained.

The ceramic industry at this site is represented by Red Polished Ware, red ware and black ware. From the style of construction, sculpture and pottery it appears that the site was occupied during first-second century AD.

64. EXPLORATION IN DISTRICT PUNE.—S.N. Rajaguru, S. Mishra, R. Korisettar, R.K. Ganjoo, N. Karmalkar and S. Ghate of the Deccan College, Pune, and S.K. Tandon of the Geology Department, University of Delhi, revisited Bori (19° 6' N; 75° 5' E) which had yielded earlier *(1986-87,* pp. 62-63) the evidence concerning the antiquity and the Acheulian tools of man in India, from the tephra deposits, with an objective to understand the extent of the tephra exposure and its relation to the Acheulian tools. The sample of the tephra deposit was taken for the dating at the PRL, Ahmedabad by the V-Th method, but the attempt was considered futile as by this method the sample can only be dated to the period of 400,000 years and not more. Subsequently the sample was dated by the K-Ar methods which gave the date of the deposit as 1-4 million years.

The tephra was exposed in 4 locations, numbering 1-4 in a downstream direction, spreading in a stretch of 4 km along the Kukdi river. At location 1, a well was dug into the tephra, where it was found to form the uppermost layer. It varies in thickness from 1.2 m. This deposit was found resting over the black fissured clay, 3 m thick, which, in turn, was sealing the brownish silt deposit, overlying a thin pediment gravel deposit overlying the bedrock. The well was dug a short time prior to our investigations. The well was still unlined and the wall debris still unsorted or modified. A dolerite

flake with normal retouch on the right lateral and distal margins was found in the pediment gravel removed from the well. The flake's weathering rind and abrasion independently of the find location, show its derivation from weathered gravel deposits. There is no other such gravel exposed anywhere near the well. As the artefact was found in the gravel debris and matches the pebbles except the pediment gravel in surface modification and as there is no other source for such-pebbles except the pediment gravel exposed in the well, it could be deduced that the flake belonged to the gravel in which it was found. This discovery implies that hominds were the inhabitants of the area prior to the tephra deposits i.e. 14 million years ago.

At locations 2 and 3 some artefacts were discovered but due to erosion of contacts their relationship to the tephra is not established.

At location 4, bedrock is overlain by 2 mtrs of compact brown clay within which a tephra lense occurs. The 3 gravel bar, from which Early Acheulian tools reported previously were collected, cuts into the silt and ash layers. The artefacts from this site included 3 choppers or cores, 3 polyhedrons and 6 bifaces of which 4 are trihedral picks, 1 bifacial cleaver and 1 crude ovate handaxe. Of the 140 flakes collected, 120 were of dolerite or basalt and 20 of the multicoloured cherts. The flakes were mostly small with an average size of 5.2 X 4.1 X 1 -. cm. They show thick wide angled platforms either plain or dihedral. Flake scars are deep and prominent with a distinct lip on the platform edge. Very few of the flakes show regular retouch. This assemblage compares well with the earliest dated Early Acheulian assemblage such as Ubediya in Israel, Koobi Fora in Kenya and Olduvai Gorge in Tanzania. The common features include the predominance of trihedral and crude ovates among the bifaces, the large component of choppers and polyhedrons with the small flakes obtained from them, the absence of soft hammer or prepared core techniques and the rarity of shaped flake tools. The Bori assemblage compares closely to these earliest Acheulian assemblages documented anywhere in the world.

The channel conglomerate yielding this Early Acheulian assemblage is disconformably capped by calcretized brownish silts with lenticular patches of gravels and dark brown clays of the Late to Terminal Pleistocene. Blade tools on white chalcedony are abundant in one of these Terminal Pleistocene gravels in the Loc 4 section. Two fragments of ostrich eggshell were associated with this Terminal Pleistocene blade tool industry. The Late Pleistocene fill, which is about 10 m thick forms a terrace surface on either bank of the Kukdi. A younger fill 3.5m thick of mid-Holocene age forms a low inset terrace in the older Pleistocene fill.

V.S. Kale of the Geography Department of Poona University and S.N. Rajaguru, S. Mishra, R. Korisettar, R.K. Ganjoo of the Archaeology Department of the Deccan College noticed Acheulian tools for the first time on the northern bank of the river Karha at the bridge crossing near Morgaon (18° 17' N; 70° 19' E) in the district. The tools were collected from the surface. The Acheulian character of the assemblage is indicated by finely finished flake cleavers (5 collected), handaxes (1 collected), cores and flakes, including some flake tools. The artefacts are made on a fine-grained compact basalt.

65. EXPLORATION IN DISTRICT RAIGAD.—In the course of exploration of the submergence area of Hetvane Irrigation Project in Taluk Pen of the district noticed an unifinished ancient cave (5.1 X 3.6 m) at Vakrul excavated into basaltic rock. The entrance of the cave has two ornamental pillars with square capital and having square, octagonal and sixteen-sided divisions. On the stylistic ground these pillars can be compared with those of the Jogeshwari caves at Bombay.

ORISSA

66. EXCAVATION AT LALITAGIRI, DISTRICT CUTTACK.—In continuation of previous year's work *(1987-88,* pp. 88-89), G.C. Chauley, assisted by G.N. Srivastava, S.K. Ganguly, K. Srimani, S.K. Dey and R.P. Mahapatra, of the Bhubaneswar Circle of the Survey, resumed excavation at Lalitagiri with a view to exposing the pathway leading to earlier stupa underlying the apsidal *chaitya-griha.*

Excavation revealed a monastic establishment (approx. 36 X 36 m); the general ground plan of this partly excavated complex appeared to be traditional one i.e. *chatussala* pattern, facing east. The general plan of the complex included a courtyard (unexcavated) in the middle, surrounded by verandah on the four sides on the back of which are the cells, entrance porch and perhaps a sanctum (pl. XXV).

The northern part of the entrance porch (3.5 metres in width and 3 metres long) has survived upto the plinth level, whereas the southern wall was missing even below the plinth. The possibility of its being an entrance porch was ascertained by the mouldings and projections on the northern wall. The entrance was divided into two parts, front and rear porch, by the addition of a partition wall. The door-jambs were missing. The two huge blocks of unfinished stone with deep cut groovings, lying near the porch, indicated the presence of the door-jambs. The porch had cells on either side. A zigzag wall alignment, found on the south-eastern corner and connected with the verandah, was perhaps used as a passage for restricted entry or an approach to upstairs.

The excavation revealed an outline of fourteen cells; however, due to brick robbing and the existence of baulks, the total number of cells could not be ascertained. Altogether, five cells on the eastern side (three on the north and two on the south of porch), five cells on the southern side, three cells on the northern and one cell on the western side, were exposed. The cells measured 3.40 X 3 m (6 cells), 3.20 X 3 m (2 cells), 3 X 3 m (2 cells) and 2.80 X 3 m (2 cells) respectively.

The verandah was 2.70 m wide on the southern side and 3.15 m wide on the western side. Traces of the verandah were exposed on the eastern, southern and western sides. The western verandah was brick-paved. Here a stone pillar 2.05 m high was found standing *in situ* position. The verandah was separated from courtyard by a stone kerb (1.20 m wide) built in three receding courses, of which the top course was carved out of huge stone slabs. The uppermost course had square tenons for fixing the pillars.

The entire monastic complex was constructed in fine brick masonry work. The outer wall (2.85 m wide) of the monastery had projections at the bottom, in receding order. The available maximum height of wall was 3.72 metres. Compact rammed earth mixed with small brickbats was noticed on

both sides of the wall, pehaps used as filling for the foundation trench. The foundation of wall was laid on stone rubble masonry. The inner wall (parallel to the outer wall) was 1.70 metre wide and the width of the partition walls for cells varied from 1.20 m to 1.40 m. A drain, provided with a covered outlet, built in stone was found in the transept of the eastern outer wall on its north corner.

A section, cut through the deposit inside a cell, revealed at least four different floor levels, made of rammed brick-jelly. The lowermost floor was found below the level of the stone kerb of verandah.

A number of architectural stone members, embossed with lion figures, *bharavahakas,* warrior figure, *purnaghata,* scroll work, etc., were collected from the fallen debris. On the basis of artistic style, these pieces could be said to be post-Gupta. The other antiquities, from the monastic complex, included iron sickles (pl. XXVIA), a spearhead (pl. XXVIB), faience bangles, terracotta animal figurines, fragmentary stone sculptures, etc.

The ceramic industry was represented by common red ware, slipped and plain black ware and blackish grey ware. The main shapes were the bowls, vases, dishes with central knob (knobbed ware of Sisupalgarh), *kadahi* (with handle) and *handi.* Fragments of sprinklers (one sherd with black polish), miniature vases and, sherds of painted China-clay-pottery (pl. XXVIC-D) and fragmentary stone vessels were also found. The stone vessels are highly polished and do not bear any evidence of chisels. The China-clay potsherds, found from the floor of the verandah were suggestive of their presence there due to some visiting monks. A terracotta bowl-shaped lamp (fragmentary) bearing oilsoot, with flaring sides and a projected cylindrical spout (shaped as elephant trunk with tusks on either side), was an interesting example. The spout, meant for the wick, was placed at a lower level, perhaps to allow constant flow of oil upto the last drop.

A stone-paved pathway was found towards east of the apsidal *chaityagriha.* An inscription was noticed on one of the stones of pavement. Three more inscriptions, fragmentary in nature, were found from the apsidal *chaityagriha* area. One of these inscriptions, in early Brahmi characters, was foun i on a stone fixed in the pavement of apsidal *chaityagriha.* Another inscription in Nagari characters was found engraved on a fragmentary votive stupa. The third one, in Gupta characters, was found engraved on the base of the pedestal of a votive stupa.

An important find from this site was a terracotta plaque, made from a mould, depicting Buddha of which the body and the hands below the waist are damaged (pl. XXVI E). Above the beaded oval halo around the head of the Buddha could be seen branch of pipal tree. The drapery is in *upaviti* fashion. To the right of the figure is a votive stupa, complete with *harmika* and *chhatra.* On stylistic grounds, the plaque could be dated to the tenth/eleventh century AD.

67. EXCAVATION AT UDAYAGIRI, DISTRICT CUTTACK.—In continuation of the previous year's work *(1987-88,* pp. 90-95) B.K. Sinha, assisted by K.M. Suresh, P.N. Biswas, P. Biswas, M.P. Singh, B. Patnaik, N.K. Behera, S.K. Bhoi and R.N. Sahoo, of the Excavation Branch IV of the Survey, resumed excavations at Udayagiri (20° 38' 45" N; 86° 16' 25" E), with the objective to expose the complete extension of the enclosure wall of Phase I and Phase II; to expose the partially exposed gateway complex; to trace the extent of the paved areas on the western, northern and southern sides;

to further excavate the other areas; and expose the partially excavated northern compound wall of the stupa.

The existence of four enclosure walls belonging to the four phases was confirmed and the walls were fully exposed on the inner and outer sides (pl. XXVII A). The partially exposed wall of Phase I was completely exposed and was found to be 20.90 m in length on the northern side. At one point, where the wall was intact, 22 courses, in two offsets, were observed. The core of the wall, made up of brickbats, was encased with handmade bricks. The western part of the enclosure was found to be collapsed. The outer and inner faces of the north-eastern corner were exposed. On the eastern side, the wall was available upto about 8.50 m which had a straight edge at the end.

The enclosure wall of Phase II was found abutting on the northern side against the north-eastern corner of the enclosure wall of Phase I. Its foundations were placed at a higher level than those of the Phase I. The wall of Phase II runs eastward upto a distance of 20.30 m and then turns towards south for 47 m, from where it again turns west and runs for about 2.25 m where it ends in a straight edge against hard earth. In the construction of this phase, the mode of construction of earlier phase i.e. core made of brickbats and encased by the complete bricks, was followed. The use of moulded bricks was also attested to. The well-formed south-eastern corner having four offsets was found upto 18 courses. The wall is wider on the southern side! The centre of the eastern wall had an opening, 4.50 m wide, meant for the main entrance to the complex. The enclosure wall of Phase III, separated by 2.30 m on the west side from the wall of the earlier phase, was at a higher level than that of Phase II. This wall having a basal width of 1.15 m, was traced upto a total length of 36. 90 m and on the northern side ended with a straight edge. On the southern side, it turned east and after a length of 3.70 m, it terminated against the compound wall of the stupa.

The wall of Phase IV, one metre west of the wall of Phase III, had its foundation at a much higher level over a filling of laterite gravel. The wall having a thickness between 1-1282 and 2.30 m was available upto a length of 40.30 m.

The gateway to the monastic complex, having three phases of construction, was found on the eastern side of the monastery. In the first phase, contemporary with the enclosure wall of Phase II, it consisted of about a 4.50 m gap in the centre of the wall to which a threshold of dressed stone blocks was added. The threshold from the surrounding area was approached by a low ramp.

In the second phase, contemporary with the enclosure wall of Phase III, a brick gateway projecting out from this wall was built in which, perhaps, the threshold of earlier phase was used as part of the entrance. Slightly west to it, a flight of brick steps, about six in number, were added to approach the threshold. The steps had solid brick platforms on its flanks, joining the two enclosure walls. The upper portions of the platforms were recessed from the flanks on both the sides and these were decorated with mouldings. The brick gateway on the eastern side joined the slightly raised pathway made up of rammed earth (pl. XXVIIIA).

The third phase of the gateway is contemporary with the enclosure wall of the fourth phase. The increase in the level inside the monastery necessitated the need of raising the level of passage. The evidence for this was noticed in the form of the steps being filled with brickbats and earth and the

provision of somewhat steep ramp giving access to the pathway through an opening in enclosure wall. At the base of the ramp, a new threshold of stone blocks, at a level higher than the neighbouring area, with a low ramp with retaining walls of bricks on the three sides for the approach, was provided. The level of the pathway was also raised by filling stone chips, laterite gravel, etc., topped by well-rammed earth.

The first door of the monastery was placed on a platform, in the core of which laterite gravel was filled with alternating layers of stone chips. The platform has a retaining wall of dressed stones bound by iron dowels. The eastern projection of the platform had an opening to enable entry through a low ramp. On either side of this ramp were the flanks of an elaborately carved stone gateway. The stone base of the left flank of the gateway was found *in situ,* though slightly displaced, the corresponding right flank was much disturbed and was found in pieces. A block of stone, which once served as lintel, carved with lotus petals and floral scroll showing human figures datable to eighth-ninth century, was found near the bottom stone of left flank. The area in front of this gate was found paved With bricks to which additions had been made later. In the last phase, it seems that the brick pavement was replaced by that of stone. A circular brick stupa, of later date, was found to the south of the pavement.

To the south of the passage, on a platform, having retaining walls of burnt brick reinforced with wooden rafters, was found a room and four *chulhas* made of burnt bricks. The room consisted of a small enclosure with a brick paved floor, sloping towards north, and drain with corbelled top at the north-western corner. The *chulhas,* made of brick, square on plan (one arm being 1.65 m), had two chambers, one for putting fire wood and vessel on top and the other for removing unextinguished ashes. A sunken circular hearth made of moulded bricks was also found on the platform. The kitchen block belongs to Phase I (pl. XXVII B).

Another interesting structure found in the southern part of the complex was a group of dressed stone pits, eight in number, capped by dressed stone slab and situated in four rows of two each and placed 2.5 m apart The section of one of these pits showed that about one metre deep pit was cut into the ground which was filled with alternating layers of laterite gravel and rubble stone and capped by stone slabs. This enclosure may have been connected with funerary rites. Underlying these pits was found a brick edged platform having a circumambulation passage of reddish rammed earth. The circumambulatory had an enclosure of bricks with entrance on the eastern side (pl. XXVII B).

The compound wall of the stupa on the northern side was exposed to a length of 20 m. It showed two phases of construction; handmade bricks were used in the first phase while moulded bricks were used in the second. The entrance to the stupa complex was from the eastern side, which was approached by a low ramp.

The antiquities recovered from the excavation, numbering ninety-two in all, included terracotta sealings with inscriptions mentioning the name of the monastery as "Madhavapura", beads, games-man, figurines of mother goddess and animals, iron objects like nails, arrowheads, knives, and a small stone carved with the image of Buddha.

The ceramic industry was represented by grey and red wares, the common shapes being jars, basins, carinated at the waist, and sprinklers. One piece of sprinkler in black ware, having very thin fabric, was an interesting find. Besides these dishes-on-stand, lids, incense burners and spouted vessels constituted other types. The decorations on the ceramics were in applique, notched and incised techniques. The decorated patterns were knobs, straight lines and dots. One spout in red ware, curved downwards, had two holes connected to the belly of the pot by two tubes. It was decorated on top with an applique design consisting of a small disc having seven holes on the circumference and one in the centre.

68. EXPLORATION IN DISTRICT SUNDARGARH.—S.B. Ota, assisted by R.K. Dwivedi and N.K. Nimje, of the Prehistory Branch of the Survey, undertook documentation of rock paintings of the painted rock-shelters at Manikmunda in District Sundargarh, located about 7 km to the south of village Hemgiri. During the course of the work, a large number of microliths were noticed embedded under the collapsed roof debris of originally extended roof in front of the present rock shelter.

The microlithic assemblage comprised of both modified and simple artefacts (fig. 16). Blades were thin and small in size, some of which show utilization marks. Modified artefacts comprised of very small sized round scraper, truncated flake and retouched blade. The noteworthy feature of this assemblage was the occurrence of a solitary chisel, grounded and polished at the working end. Artefacts were quite fresh, and were made mainly on chert, chalcedony and quartz. Quartzite was rarely used.

PUNJAB

69. EXCAVATION AT SANGHOL, DISTRICT LUDHIANA.—In continuation of the previous year's work *(1987-88,* pp. 95-99) the Excavation Branch-II of the Survey in collaboration with the Department of Archaeology and Museums, Government of Punjab, Chandigarh, resumed excavation at Sanghol under the joint direction of C. Margabandhu and J.P. Srivastava, assisted by S.S. Nayak, R. Krishnaiah, J.S. Dubey, Lai Singh Mamani, V.P. Verma, Birbal Sharma, J.S. Bisht, D.D. Dogra and Virendra Kaul of the Survey and K.K. Rishi, Kuldip Singh, Gurdev Singh, Yograj and Heera Singh of the Department of Archaeology and Museums, Government of Punjab, with objectives of exposing the area around the palace and religious complex at Hathiwara; and to expose the monastic buildings and the stupa at the Stupa site.

The excavations brought to light a vast brick structure (pl. XXIX) hereinafter called the 'palatial remains' which is hitherto not known from other Kushana sites. The excavations revealed well-built brick floors which were extending towards north-western side alongwith the multicoursed thick walls. On north-western corner of the palatial complex, a trench was dug upto the natural soil to know the stratigraphical sequence (pl. XXXA). Twenty-five coin moulds of the Kunindas at the lower levels was an interesting find, representing on the obverse, a deer in front of a standing female figure (Lakshmi) holding a lotus in her hand and bearing on the circular margin, a Brahmi legend, *rajno*

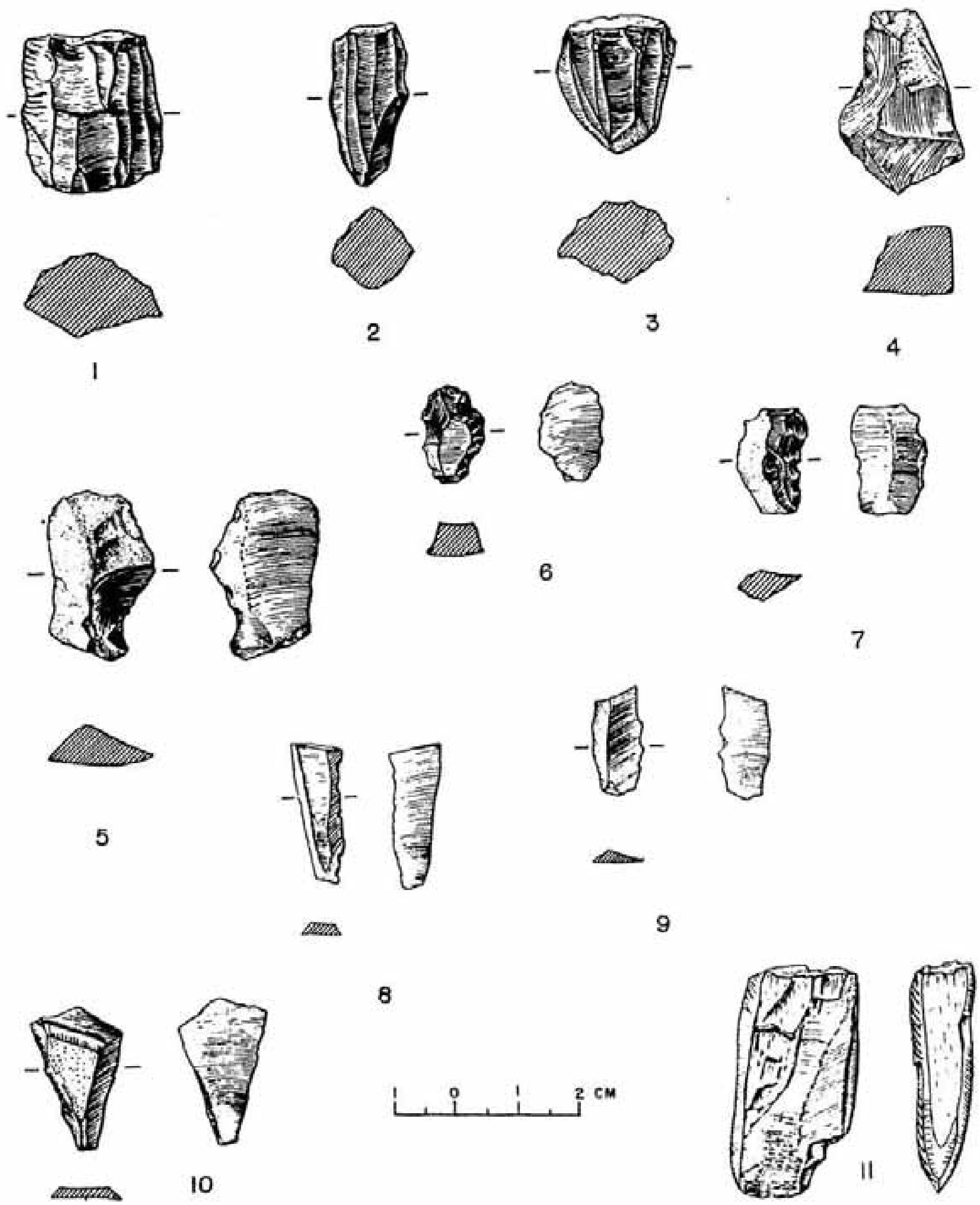


FIG. 16. *Manikmunda*: 1, *blade core (bidirectional)*; 2-3, *blade core (unidirectional)*; 4, *flake core (utilized)*; 5 and 7, *end flake (utilized)*; 6, *round scraper*; 8, *blade (retouched)*; 9, *blade*; 10, *end flake (retouched)*; 11, *edge polished chisel (utilized)*

Kunindasya Amoghabhutisya; and on the reverse showing the symbols such as tree in railing, *Srivatsa, Svastika,* arched hill and river represented by many lines. The site excavation revealed the following cultural sequence:

(A) Pre-Kushana i.e. Sunga, Kuninda, Parthian, etc. (from *circa* second century BC to first century AD

(B) Kushanas *(circa* first century AD to *circa* third century AD)

(C) Late Kushana and late historic *(circa* third century AD to fourth-fifth century AD)

From the pre-Kushana phase the ceramics of red ware, both unslipped and slipped variety, in different shapes such as bowls with incurved rims, storage jars and other utilitarian vessels; terracotta beads, bangles, rings, beads and pendants of shell, etc., were found. Houses were built in mud bricks measuring (35 X 23 X 5 cm). Several occupational floors and a few irregular circular or oval-shaped hearths, crucibles, clay lumps, corn bins, etc., were also found.

In the Kushana phase, a massive brick structure, with many additions and alterations, representing remains of a huge structural complex, was exposed. These periodical renovations were indicative of its fairly long use over an extensive period. The entire structure was paved with double course of bricks and each of its divisions had different orientations, possibly indicating different purpose and use.

The nucleus part of the structure was a public audience hall with spacious rectangular brick floor extending to the west measuring 12.20 m north-south and 1000 m east-west. This hall had well laid out brick flooring in east-west orientation; the bricks used for the construction were of two size, (32 X 21 X 5 cm and 35 X 24 X 5 cm). Many circular post-holes, cut on the brick floor with different orientations, were noticed. The walls were running in north-south and east-west direction. During the course of excavations many walls made of reused bricks over the floor of the later additions, were noticed. The entrance pathway (pl. XXXB), from the southern side, led to the raised platform with four post-holes in alignment, possibly a seat, meant for royal dignitary, placed between the two parallel walls, measuring 10 m in length and 2.20 m in width. The plinth of this structure, having solid foundation of which 10 to 45 brick courses (brick size : 31 X 20 X 5 cm, 33 X 22 X 5 cm and 32 X 21 X 5 cm) were traced. On the eastern side was found an extensive brick floored verandah, separated from the main complex with thick brick wall running in north-south direction.

On the western side of the palatial complex were traced about twenty rooms of various sizes suggesting that the building was perhaps meant for administrative-cum-official purpose, the largest room measured 6.40 X 2.30 m and the smallest 200 X 1.90 m. The floors of all these rooms were made of lime *kankar* mixed with sand, with thickness varying from 1 cm to 3 cm.

This palatial structure was surrounded by an outer wall, measuring 1.10 m in width, running in north-south direction and turning towards east-west direction, the meeting point of which formed some kind of a circular bastion, perhaps indicating its existence within the citadal enclosed by a defence wall and a mud-built rampart (fortification), traced in different areas of the Hathiwada mound.

The antiquities recovered from this area included seals and sealings, one of which had a inscription in Kharoshthi and depicted a couchant bull facing right and datable to the second-first

century BC (pl. XXXIA), and others ranging in date between second century BC and sixth century AD, coin moulds of Kuninda rulers of the first century BC (pl. XXXIB), beads of semi-precious stones such as agate, chalcedony (pl. XXXIIA), crystal, quartz (pi. XXXIIB) and jasper, shell (pi. XXXIIC); beads and bangles, copper antimony rods (pl. XXXIIIA); bone points (pl. XXXIIIB); dice of ivory and bone (pl. XXXIVA); a number of terracotta objects such as cart-wheel (pl. XXXIVB), beads, crucibles (pl. XXXIVC), etc.

Excavations were continued in the area, identified as the religious complex, and the two burnt brick structures (pl. XXXV), identified as 'fire altars' were further probed. This season's excavation revealed six more 'fire-altars' containing ash deposit. In the absence of any evidence of habitational deposits, these pits were taken to be of religious nature.

The earliest evidence, of sun-baked bricks (measuring 31X 20 X 5, 3 2 X 2 1 X 5 and 3.3 X 22 X 5 cm), noticed in the lower levels, was coeval with the early settlement of the palatial complex. The associated ceramics of red ware consisted of incurved bowls, vessels with stamped designs, animal figurines such as bull, lion, bi-hubbed cart-wheels, ear-studs, copper antimony rods and copper coins of Kuninda (Amoghabhuti), and coins of Indo-Parthian (Gondopharnes) rulers. Overlying them was noticed a compact clay 25 cm thick, over which six fire altars, were built (pl. XXXVI).

Fire altar No.l, measuring 2.55 X 2.50 m with 18 brick courses and two offsets on the eastern side, was located towards the north-east. The northern wall had a single course of bricks. The interior of the structure was full of ash mixed with charred grains, potsherds, charcoal, etc. Fire altar No.2 adjoining the fire altar No. 1, was another cistern-type rectangular construction measuring 2.30 X 2.50 m. Fire altar No.3, situated in the south-western comer, was also a cistern type enclosure measuring 3.05 X 1.75 X 1.20 m. The northern wall, having two off-sets, had traces of mud plaster over them.

Fire altar No.4 was situated towards west and measured 2.80 X 2.50 X 1.20 m. Its western wall had an off-set in two parts. An entrance-like opening of a later date was traced towards the western side. Further towards west it was provided with a brick platform measuring five metres and having bricks-on-edge steps. Fire altar No.5, situated towards the north and measuring 2.55 X 2.70 X l.10m, had two off-sets on its eastern wall. The interior was provided with a rectangular sub-chamber with an additional wall, 42 cm in width.

Fire altar No.6, situated on the northern side and measuring 3.25 X l.70 X 1.20 m had two offsets. At the bottom, it had a thickness of 50 cm with five brick courses. In between them, there was a platform measuring 3.25 X 1.50 X 1.50 m, to which all the fire-altars were interlinked.

In addition to these six fire altars, three more cisterns of similar type were partly exposed. These were interlinked to a wall of the fire altar Nos. 6 and 7 towards the north. The foundation of these was lower than the other six fire altars. All these made a square, measuring 9.75 X 10.05 m and divisible into nine rectangular structures of different sizes.

Towards south, a brick paved floor, perhaps built at a later time, was connected to the main religious complex. On the top of the platform were found remains of some water channels, possibly for some religious ceremonies. This portion seems to be the right wing of the falcon-shaped quadrangular fire altar, facing east, known from the Vedic and later Vedic texts as *Chaturasra*

Syenachiti. The other wing, in the shape of a paved brick platform, was also traced towards the north with many additions and alterations in subsequent periods (pl. XXXVII).

Towards the western side there was a structure which was perhaps the 'tail part' of the falcon-shaped altar, built with well laid out brick floors, with later additions and alterations.

An important evidence was the skeletal remains of an animal (horse or bull?), found buried (pl. XXXVIII) in the strata of early phase, outside the religious complex in the north-eastern direction.

A structure with many rooms, built over a platform, was exposed towards the north of the religious area. A ramp and a gate had been provided to this structure. Nearby, a mud fortification, rivetted with burnt brick in various stages was found.

Copper coins belonging to the Kunindas, Indo-Parthians and Kushanas were found (pl. XXXIX A). Among these, a miniature pot containing one hundred copper coins of Gondopharnes, a terracotta serpent and a few gold foils were discovered inside the fire altars. Beads of semi-precious stones; terracotta objects like moulds of human figurines (pl. XXXIX B), cart-frames, cart-wheel, textile stamps (pl. XL A), seals and sealings (pl. XL B), animal figurines, etc.; copper objects like rings, antimony rods, ivory dice and combs; and iron arrowheads were found in and around the religious complex. Another important find of this season was a standard type gold coin of Samudragupta bearing the legend *'Samarasata vitata vijayo Jitaripura Jito divam Jayati'* and *'Samudra'* on the obverse and *'parakramah'* on the reverse (pl. XXXIX C).

Apart from these, a large number of ceramics ranging from pre-Kushana (i.e. Sunga-Kuninda), Indo-Parthian, Kushana and the Gupta periods were found.

Previous year's excavations at the northern and eastern side of the monastic complex (Stupa No.l), known as SGL-5, had exposed bases of two brick-built pillars measuring 1.30 X 1.30 m indicating the existence of a gateway. This year's work revealed two more masonry pillars in front of the main entrance, leading to the courtyard of the monastery. These four pillars were, perhaps, pan of a covered verandah. The excavation at the courtyard exposed the brick-flooring, lime-mixed *kankar* floor, covered drains, and basement consisting of three rooms.

In front of the main entrance was a big hall, square in plan and having square brick-built pillar in the centre, with an entrance to the south. In front of this hall was a closed verandah. To the east and west of this hall were found square and rectangular rooms, the exterior wall surface of which had evidence of lime plaster at places. On the eastern side near the main entrance of monastery and adjacent to the verandah, a room was located. A square brick pillar was also noticed at a distance of about 16 m away from this main entrance on the eastern side. Some extension of the brick *pradakshinapatha* was noticed which was broad in the eastern portion (about 6.60 m wide). Some rectangular masonry pillars, near the votive stupa were also recovered. In front of the pillar, a 2.60 m wide pathway surrounded by three rooms was also traced.

These structures were associated with Kushana artefacts and pottery, the antiquities included coins, bangle pieces, beads, iron objects and terracotta human and animal figurines.

70. EXCAVATION AT NAGIARI, DISTRICT RUPAR.—K.K. Rishi and Kuldip Singh, assisted by Yog Raj, Gurdev Singh, Hira Singh, Pardip Singh, and Ranjit Singh, of the Department of Archaeology, Punjab Government, undertook excavation at Nagiari (30° 37' N; 76° 41' E) in Rupar district. The mound lies approximately 200 yards (182-88 m) to the east of present village on the western bank of an old water channel called Patiali Rao.

Earlier, explorations of the site had resulted in the discovery of the PG Ware and oval hearth. With a view to understanding the PG Ware settlement in the region and to know the relationship between the settlements of this culture and those of the other associated cultures, excavation was taken up at this site. Excavations revealed cultural deposits of 3 m divisible into the following cultural periods:—

IA	—	Late Harappan
IB	—	PGW/Grey ware culture—*circa* twelfth century BC to sixth century BC
II	—	Kushana
III	—	Medieval AD 1300 to AD 1600

The actual area inhabited by the Late Harappans (Period IA) could not be traced; the find of some faience bangle pieces and a typical sherd of dish on stand with hooked rim from the surface of the mound suggested the existence of Late Harappan period. Later, three more Late Harappan sherds, one of them being fragment of a storage jar, and other two of jar and a vase were also found. Ancient course of rivulet noticed in some of the trenches was perhaps indicative of the Late Harappan settlement having eroded completely in the subsequent period, by the rivulet Patiali Rao.

Period IB was represented by PG and grey wares. The PG Ware was of fine fabric and of ashy to dark grey colour, the common types were dishes and bowls with straight or concavo-convex sides with round or sagger base, with designs painted in black pigment. There were painted designs on the inner and the outer surface of dishes while the bowls showed painted designs only on the exterior. The painted designs included simple bands around the rim on both sides, groups of vertical or oblique lines, dots, spirals, concentric circles, semicircles and various other varieties. The main ceramic types included miniature pots, dishes, *katori, koli, thali, lota, chhanna,* etc. and the shapes in the plain grey wares and the associated red wares were dishes, bowls, basins of various sizes, pitchers, vases, etc.

Remains of post-holes were encountered in almost all the trenches but no complete house could be traced. The remains of post-holes were suggestive of the people living in thatched huts. Circular and rectangular corn bins of compact yellow clay were noticed. A rectangular corn bin, 74 cm wide, was traced upto a length of one metre. Two circular corn bins of 70 cm diameter and 1 .22 m, diameter were also noticed. Some charred grains and animal bones were recovered from different layers of this period. Among the grains, rice and wheat were identified.

The antiquities recovered from the period included copper objects, beads, antimony rods, nails, borer, spindles, etc.; iron arrowheads, nails, chariot jolting and lamps; terracotta animal figurines, ear-stud, gamesmen, dice, toy-cart wheel and frames; bone stylus, etc. Among other finds were the pendant type topaz beads, beads of agate, jasper, carnelian, terracotta bangle pieces and green glass.

The site was deserted after period-IB. From the layer indicating the desertion the only two NBP sherds were found. Later, the site was reoccupied during the late Kushana period. The ceramic industry of the period was represented by incurved bowls and some stamped sherds.

No structural remains of this period were noticed. Two copper coins, terracotta areca-nut shaped beads and animal figurines were recovered from this deposit.

After Kushana period the site was deserted again only to be occupied during the medieval times. The new settlement was represented by the late medieval pottery represented by sharp edged bowls, incense burners, *chilums,* etc. No structural or other habitational evidence of this period was encountered. The antiquities recovered from the deposits included glass beads and bangles, ivory and bone objects and some copper coins.

On the west and north-west of the mound large oval-shaped hearths belonging to this period were noticed. These hearths were of varying sizes, measuring 3.00 X 1 .00 X 0-50, 3.45 X 0.95 X 0.37 m and 3.70 X 1.00 X 0.70 m. All these hearths were identical and their inlet resembled much with the modern day glass bottle. They had been made on the virgin soil in the north-east to south-west orientation with inlet on the north-east side. The exact purpose of these hearths could not be ascertained.

RAJASTHAN

71. EXPLORATION IN DISTRICT BHARATPUR.- D.N. Dimri of the Jaipur Circle of the Survey, in the course of village-to-village survey explored the following sites:

Taluk	Village/Site	Nature of remains
Wer	Alipur	Fort *(garhi)*
-do-	Ballabhgarh	Fort
-do-	Dharsoni	Ancient site
-do-	Govindpura	Ancient mound
-do-	Hatyori	Jalmahal and structural remains
-do-	Jeeved	Ancient mound
-do-	Kherli Goojer	Ancient buildings
-do-	Lakhanpur	Ancient mound and ruins of structures
-do-	Maharajpura	Red ware, black-painted red ware
-do-	Moodiya Lalita	Mound and temple
-do-	Moreda	Ancient site
-do-	Nithar	Sculptures stepwells, chhatris and historical mound
-do-	Rajgarh	Ancient site
-do-	Salempur Kaian	Haveli

72. EXPLORATION IN DISTRICTS JAIPUR AND SIKAR.—P.L. Chakravarty and Vijai Kumar, of the Directorate of Archaeology and Museums, Government of Rajasthan, noticed the following sites of interest:

District	*Site*	*Nature of remains*
Jaipur	Bheem Ji Ki Dungri	Prehistoric rock paintings and micro!iths
-do-	Beejak Ki Pahari	Prehistoric rock paintings and microliths
-do-	Cheethwari	Copper age (Ganeshwar culture)
-do-	Ganesh Dungri	Prehistoric rock paintings and microliths
-do-	Gogera	Sunga-Kushana
-do-	Gothnari II	Sunga-Kushana
-do-	Medh	Copper age (Ganeshwar culture)
-do-	Pragpura	Copper age (Ganeshwar culture)
Sikar	Ajit Garh	Copper age (Ganeshwar culture)
-do-	Bhopya	Copper age (Ganeshwar culture)
-do~	Bhudoli	Copper age (Ganeshwar culture)
-do-	Doken	Copper age (Ganeshwar culture)
-do-	Dungar Das Ki Dhani	Copper age (Ganeshwar culture)
-do-	Ghala	Sunga-Kushana
-do-	Ghasipura	Copper age (Ganeshwar culture)
-do-	Gosaiyo Ka Math	Copper age (Ganeshwar culture)
-do-	Harijanpura	Copper age (Ganeshwar culture)
-do-	Jaitpura	Copper age (Ganeshwar culture)
-do-	Jarinda	Copper age (Ganeshwar culture)
-do-	Khard-Beenjpur	Copper age (Ganeshwar culture)
-do-	Mokabas	Copper age (Ganeshwar culture)
-do-	Neemed	Copper age (Ganeshwar culture)
-do-	Papra	Late Stone Age, microliths
-do-	Sedh Ki Dungri	Copper age (Ganeshwar culture)
-do-	Shyamwali	Sunga-Kushana
-do-	Todawali	Copper age (Ganeshwar culture)
-do-	Tunda	Copper age (Ganeshwar culture)

73. EXCAVATION AT GALVASHRAM, GANESHWAR, DISTRICT SIKAR.—In continuation of previous year's work *(1987-88,* pp. 101-102), P.L. Chakravarty and Vijai Kumar of the Directorate of Archaeology and Museums, Government of Rajasthan, resumed excavation at Galvashram, Ganeshwar (37° 40' N; 75° 51' 30" E), with the objective to understand the copper age settlement chronology with special reference to iron technology and metallurgy in the region. For this purpose, excavation was

taken up at different points of the mound. A 4.15 m thick habitational deposit revealed continuous occupation at the site which was divided into three cultural periods.

Late Stone age (Period I) was characterized by hunting-gathering settlement represented by microlithic industry, animal bones and stone paved floors. Microlithic tools, mainly on quartz and chert, were essentially geometric in character. The tool assemblages included retouched and blunted back blades, triangles, obliquely blunted or pen knife blades, points, crescents, trapezes and transverse arrowheads. Scrapers and burins, made on flakes, were found in very small numbers. Complete absence of crested guiding ridge technique was a distinctive feature of the period.

A large quantity of animal bones was also met with. The lower levels of this period yielded relatively smaller bones than those found at the upper level, perhaps indicating dependence of the people on smaller animals like birds and other such creatures during early periods; at the later stage hunting of bigger animals was resorted to.

Evidence of structures was found in the form of paved floors and outlines of the circular hut. The floors were paved with river pebbles and schist-slabs, quarried from the rocks across the river.

Period EL was the copper age characterized by the introduction of new material traits and change in economy. On the basis of the material culture this period was further sub-divided into two phases.

The material remains of the people belonging to Phase I of Period II comprised of small implements of copper, bone and beads of semiprecious stones, terracotta and steatite and bangles of clay and shale. The ceramic assemblage was divided into two groups. The first group of pottery was pink to buff-coloured, thin-walled, soft-fired light ware, consisting mainly of small to medium-sized kitchen vessels, vases and jars, footed and ring bases, usually with narrow and short incurved rims. A large number of them was painted in black with dots, dashes and curves executed in white to highlight the black painted designs executed earlier. The designs suggested preponderance of geometric motifs, consisting of volutes, series of wavy lines, obliques, balls, triangles, crosses and broad bands. It is significant to note that the occurrence of irregular marks on the surface of the pottery leading to uneven section suggested their being made on light wobbling wheel. In this category was also included a thick and sturdy ware, represented by basins, decorated with incised geometric designs, usually in red.

The pottery of the second category was finer in texture and surface treatment. Even the colour on the surface was brighter (red) and evenly distributed. The pottery of this period was fashioned on faster and heavier wheel. It was also painted in black. Pots of this category included dishes on stand, basins, troughs, jars, vases, bowls, etc.

Phase II was represented by copper implements like arrowheads, spearheads, chisels, fish hooks, razor blades, rings, bangles, hair pins, antimony rods, etc. These were usually thin and light. Double spiral-headed copper pins, found from this phase, were akin to the type found in west and central Asia.

The pottery types included 'S'-shaped jars, perforated jars, beakers, basins, goblets, handled cup, etc. The pottery was profusely painted and the designs included floral and faunal motifs (intersecting circles, peacocks, pipal and banana leaves, trees, deer, fish and flowers).

The most remarkable structure in this phase was a stone embankment raised to protect the settlement from frequent floods. The 3-08 m structure, running across the mound from north to south parallel to river Kantli, was traced to a length of 30 m. The average thickness of the structure was about 4 m.

Iron Age (Period IB) was represented by typical pottery of the full-fledged iron age. A monastery on the site seems to have existed at a time when punch-marked coins were in vogue and lived through the middle of the first century AD. 1'he iron objects included sword blades, lances and spearheads, small daggers, knives, sickles, axes, nails, mouth pieces of blacksmith's bellows, crucibles, etc.

The evidence of iron smelting was provided by enormous deposits of iron slag, unsmelted or partially smolten iron ore and lumps of a crystalline material. The most significant evidence was the discovery of two furnaces in the early phase for iron smelting and forging of iron objects. The hearths, which were of open type and provided with bellows, indicated the advanced technique of iron metallurgy in those days.

A preliminary examination of the available evidence suggests that iron smelters at Ganeshwar exploited the fuel and ore resources available locally. This is noteworthy since the site is located in the midst of Patiala deposits of haematite and magnetite. They perhaps extracted the metal directly through a primitive furnace without fluxing the ore. Among the two furnaces so far exposed, the first was used to extract the bloom and the second was meant for heating during the forging.

The pottery was usually wheel-turned and of red colour in medium or fine fabric, mostly treated with wash or slip. The common shapes were the bowls, lid-cum-bowls and lipped bowls with spouted channels. Noteworthy antiquities of the period comprise of iron and copper implements, different types of terracotta and stone beads, objects of bone and conch, etc.

TAMIL NADU

74. EXPLORATION IN DISTRICT CHENGAI ANNA.—G. Thirumoorthy of the Madras Circle of the Survey, in the course of village-to-village survey, discovered the following sites of archaeological interest:

Taluk	*Village/Site*	*Nature of remains*
Madurantakam	Allur	Medieval sculptures
-do-	Arappedu	Early medieval site, Siva temple
-do-	Attur	Megalithic site, Siva temple and gateway of late medieval period
-do-	Baburayanpettai	Varadaraja Perumal temple, loose sculptures and late medieval inscription in Tamil characters

Taluk	*Village/Site*	*Nature of remains*
Madurantakam	Chittamur	Early historical site, hero-stones, and Siva temple of Nayaka period
-do-	Kadamalaiputhur	Megalithic burials, early historical pottery and late medieval sculptures
-do-	Kalathur	Late medieval Siva temple and Tamil inscriptions
-do-	Kalivakunnam	Late Chola sculptures
-do-	Karasangal	Medieval site
-do-	Kil Attivakkam	Medieval site and sculptures
-do-	Kilpattu	Neolithic celts
-do-	Kulathur	Megalithic burials
-do-	Kunnakaranai	Early medieval site and Siva temple
-do-	Munnal Kil Minnal	Early historical and early medieval sites
-do-	Munankulam	Early historical site
-do-	Murungai	Late medieval ruined Siva temple
-do-	Nedungal	Neolithic tools and early historical site
-do-	Perumper-Kahdigai	Megalithic burials, early historical site, Siva temple with Tamil inscriptions of eleventh century and Vijayanagar and Nayaka temples
-do-	Porpanankaranai	Early medieval site and late Chola Siva temple
-do-	Rajapalayam	Medieval site
-do-	Siriperpandi	Upper Palaeolithic tools, early historical site, Tamil inscription datable to twelfth century and late medieval site with glazed pottery
-do-	Sitapuram	Megalithic-stone and cairn-circles, late and medieval sculptures
-do-	Veliyambakkam	Early historical site, Tamil inscriptions and Nayaka sculptures

75. EXPLORATION IN DISTRICT DHARMAPURI.—K.S. Sampath and R. Krishnamurthy of the Department of Archaeology, Government of Tamil Nadu, in the course of explorations, noticed a number of megalithic sites at Hanumanthapuram, Manchyanapalli and P. Agraharam and a few prehistoric rock-paintings at Eriyur.

76. EXPLORATION IN DISTRICT MADURAI.—K.S. Sampath and V. Vedachalam, of the State Department of Archaeology, Tamil Nadu, during the course of exploration in the Kambam Valley discovered an iron-smelting site at Ellappatti and collected from there iron tuyeres (clay-tubes) and iron-slag.

77. EXPLORATION IN DISTRICT NORTH ARCOT.—K. Moortheeswari of the Madras Circle of the Survey, in the course of village-to-village survey, located following sites:

Taluk	*Village/Site*	*Nature of remains*
Gudiyatham	Abdullahpuram	Eighteenth century palace
-do-	Alanganery	Megalithic urn burials
-do-	Bairavamalai	Jaina beds in natural caverns
-do-	Bomminayakanpalayam	Hero-stones
-do-	Karigiri	Eighteenth century mosque
-do-	Latteri	Remains of late medieval fort
-do-	Sevur	Siva temple of Chola period, Vishnu temple of Vijayanagar period and inscription of Rajaraja I

78. EXCAVATION AT KUDIKADU, DISTRICT SOUTH ARCOT.—The Department of Ancient History and Archaeology, University of Madras, under the direction of K.V. Raman undertook excavation at Kudikadu situated on the east coast of Tamil Nadu and 10 km south of Cuddalore, on the road to Chidambaram. The extensive mound, covering an area of about 90 acres and rising to a height of 2 to 3.5 m above the surrounding plain, belongs to the SIPCOT Industrial Complex.

Two trenches, KDU-1 and KDU-2, were laid out on two different points and cutting were carried down to the natural soil, at a depth of 2.5 m at KDU-1 and 3.2 m at KDU-2.

The whole deposit represented a single cultural period, characterized by ceramic varieties like the Rouletted ware, amphorae pieces (both original and imitated), black-and-red ware, black ware, red polished ware, red-slipped ware and large quantity of coarse red ware. The antiquities recovered, included a large number of beads made of glass, paste and semiprecious stones (pl. XLI A), terracotta (pl. XLI B) human figurines, ear ornaments, votive lamp, spindle whorls, gamesman and hopscotch, a copper pendant and pieces of various iron objects. Alongwith these antiquities, the raw materials used in the bead making industry viz., glass and various types of semiprecious stones were also found in plenty.

In KDU-2, at a depth of 0.47 m, a 0.70 m wide burnt-brick wall, having three courses and running in east-west direction, was exposed (pl. XLII). As the wall continued beyond the trench, its full length and orientation could be determined after further excavation. The size of the bricks used in the construction was 35 X 22 X 6 cm which is similar to the bricks found in the excavation at Kaverippumpattinam, Uraiyur, Kanchipuram and Appukallu in Tamil Nadu. The presence of many incomplete beads on the floor adjacent to this wall suggests that it was perhaps associated with bead-making industry. In the same trench, at a depth of 0.7 m, a floor level with post-holes was noticed. On the basis of finds, the site could tentatively be dated between the first century BC and second century AD.

79. EXCAVATION AT MANMALAI, DISTRICT THIRUCHI.—S.S. Selvaraj and K. Nedunchezhian of the State Department of Archaeology, Government of Tamil Nadu, explored the site at Manmalai, about 2 km east of Gangaikondacholapuram, which yielded pottery, bricks and a stone image of Mahishasuramardini, the latter perhaps brought from Kalinga. Later, trial-excavation was carried out to understand the archaeological potentialities of the site and for this purpose three trenches were laid. Two trenches, MAN I and II were laid near the mound while MAN in was taken at Guruvalappar Koil, about 2 km west of Gangaikondacholapuram. Trench MAN I yielded only brickbats. A brick-stone flooring was notice at the depth of 3.90 m.

In Trench MAN II, pieces of black granite, perhaps used as base of pillars, were found. A disturbed brick structure having nine courses of bricks, was found at a depth of 2.70 m. The thickness of the wall was 1.10 m, which is strikingly similar to the brick walls exposed at Gangaikondacholapuram during earlier excavations.

The trench at Guruvalappar Koil revealed a fortification wall, built exclusively with laterite stone (locally know as Sembaram Kallu). The finds from this trench included black bangle pieces, knobs, roof-tiles with charcoal remains, red ware sherds, decorated pottery pieces, celadon ware, etc.

80. EXPLORATION IN DISTRICT TIRUNELVELI-KATTABOMMAN.—K.S. Sampath and M.S. Santhil Selvakumaran, of the State Department of Archaeology, Tamil Nadu, explored the sites of Mangudi. Old Courtalam, Chayamalai and Pattakurichi in Tirunelveli-Kattabomman district and also conducted extensive surface exploration along the bank of the river Vaigai.

The exploration at Kottaimedu in Mangudi which is about 25 km north of Sankaran Koil yielded microliths such as blades and flakes, sherds of Black-and-red ware and Chinese celadon ware, tiles, pottery of the medieval period and two copper coins of Rajaraja Chola.

At Old Courtallam, situated on the bank of a small rivulet known as Azhudhakanni river, microlithic tools and megalithic burials, such as cairn-circle, were noticed.

UTTAR PRADESH

81. EXCAVATION AT FATEHPUR SIKRI, DISTRICT AGRA.—In continuation of the previous year's work *(1987-88,* pp. 103-105), Shankar Nath, assisted by P.B.S. Sengar, C.P. Singh, Makrand Prasad, B.B. Sur, Y.K. Sharma, and Chiranji Lai, of the Agra Circle of the Survey, resumed excavation at Fatehpur Sikri. The area selected for excavation is situated 1 km north-west of Jama Masjid and about half a kilometre east of the northern end of the western fortification wall of the city. The excavation established the beginning of the occupation at the site around 1200 BC which continued till the seventeenth century AD. The excavation revealed five occupational periods with intervals in between.

Period I was represented by a deposit of compact brown clay mixed with small kankar. The ceramic industry was represented by fragments of Ochre Coloured ware, having coarse fabric, ill-fired with slip, ranging from orange to dark red-orange in colour, which could be rubbed off easily. It was wheel-turned and decorated with oblique incisions and criss-cross designs. The main types included vases and bowls. No structure/antiquity was encountered in this period. This could perhaps be due to the reason of excavating in a very limited area. The deposits of this period were divided

into two phases by an intervening thick layer of silt indicating the possibility of the people of the earlier sub-period deserting the site for a short span due to flood.

Period II was represented by a thick deposit of PG Ware, black-and-red and associated red wares. The shapes in the PG Ware were confined to the deep and shallow dish, bowls and miniature vases. The painted designs of the PG Ware included the horizontal and vertical bands, horizontal rim bands, dots, sigmas, concentric circle, strokes, wavy lines, spiral designs, double line enclosing dots, leaf and floral patterns, etc. The shapes in the black-and-red ware were mainly bowls and dishes which bore no painting. The PG Ware and black-and-red ware people seem to have been coexisting and living in houses made of wattle-and-daub. Remains of post-holes, ash and reed marks in burnt clay lumps were indicative of the destruction by fire.

The antiquities recovered from the levels included terracotta animal figurines, bangles, balls, toy-cart wheels, beads of various types and bone objects such as arrowheads, points, whistle, etc. A large number of bone objects, were made of semi-burnt bones.

Period III was marked by the presence of red, black-slipped and NBP Ware sherds. The red ware was of fine, medium and coarse fabrics and was the principal ceramic of the period. The shapes in fine and medium fabric were bowls, vases and basins, decorated with cord designs; the cooking vessels were confined to red ware of coarse fabric. NBP Ware, represented by bowls and basins, was found in limited number. The antiquities of this period included terracotta beads, bangles and balls.

Period IV was marked by the structures of the Sunga and Kushana periods in the form of walls and floors. Two small rooms, built of bricks and undressed stones, of a house complex were also exposed. In the rooms were found three hearths in a row. The main pottery was red ware which is well comparable with the. Sunga and Kushana pottery from other excavated sites.

Other important finds of the period included copper bangles, iron implements, terracotta human and animal figurines, bangles, beads, hopscotch and decorated dish.

Period V was represented on the surface of the mound by the presence of the remains of medieval structures and corresponding wares i.e. the red ware, glazed ware and crackled glazed ware, the prominent shapes being vases, bowls, shallow dish and carinated *handi.* No antiquity belonging to this period was encountered.

82. EXCAVATION AT SRAVASTI, DISTRICT BAHRAICH.—In continuation of the previous year's work *(1987-88,* pp. 106-108), a team of archaeologists from the Kansai University, Suita, Osaka, Japan, and the Excavation Branch III of the Survey under the joint leadership of Dilbar Bhengra and Yoshinori Aboshi, resumed the excavation at the Jetavana area, Sravasti, with the objective of exposing the tank and correlating it with the other nearby structures and to understand the nature of deposits.

The stupa, partly exposed last season, was subjected to further excavation. It was found to have a central rib (pl. XLIII), running east-west and measuring 8.73 X 1.35 m. Excavation of the two opposite quadrants revealed the construction of the stupa over the remains of a rectangular brick cell, with three extant brick courses, belonging to the Kushana period. Its three arms were fully exposed.

The east-west oriented tank, partly exposed during the previous season was further exposed to reveal its eastern and southern sides (pl. XLIV). The tank was constructed in terraced manner. Three terraces were noticed in the southern side. The uppermost terrace was found to be 24.16 m long, 1 -7 m wide and 18 brick courses high. This terrace was provided with two flights of steps to reach the eight

coursed high second terrace. The third terrace was ten brick courses high and was 0-57 m wide at its top. The structural condition of the tank was indicative of numerous repairs carried out during the subsequent period.

Excavation in the eastern side of the tank revealed four terraces. A flight of steps was provided to this side to reach the bottom of the tank. The uppermost first terrace was 21.70 m long and 1-20 m wide with the extant height of twenty brick courses. The second terrace was 24.60 m long and nineteen brick courses high. The length and width of the third terrace was 27.75 and 0.57 m respectively, whereas fifteen brick courses high fourth terrace was found to be 10.50 m long and 0.47 m wide. At the south-east corner of the uppermost first terrace was noticed a drain to allow the inflow of the water.

Apart from a temple and votive stupa belonging to the Gupta period, exposed during previous year's work, two more votive stupas (numbered as 3 and 4 and measuring 2.70 X 0.45 m and 2.30 X 2.20 m respectively) were exposed in Area G this year (pl. XLV A).

The eight courses high brick platform, over which were built the temple and the stupa, was enclosed by a wall to which an entrance was added from the north. At a distance of 6-30 m east from the votive stupa No.4, a structure, perhaps a tank, was partly exposed. It was 1.55 m deep and had twenty brick courses. At a distance of about one metre towards the west, from the edge of the tank, another enclosure wall, 6-80 m long (north-south), 1.35 m wide (east-west) and eleven brick courses (0.63 m) high, was noticed.

Within the two parallel walls (pl. XLV B), running north-south, were found four cells (13.50 X 13.07 m), datable to the late Kushana period. The brick sizes measured 0.34 X 0.26 X 0.05 m and 0.32 X 0.25 X 0.05 m.

The excavation in the area, between the brick platform and the tank/votive stupa, revealed remains of two temples (numbered as Temple 1 and 2) built on the platform. Temple no. 1 had the entrance from the north. Its floor (3.76 X 3.10 m) was brick-paved. Connected to this temple was another temple measuring 4.25m X 2.32 m, which was exposed.

The ceramic industry, recovered during the season ranged from early Kushana to Gahadavala. The fabric of the potsherds mostly of red ware, was from coarse to medium. An inscribed sherd in black slipped ware was found from the Kushana level. The pottery types were mostly utilitarian which included vases, lids, sprinklers, spouts and bowls. In the subsequent phase, the Gupta period, red-slipped pottery represented by vase, storage jar, basin, *lota,* lid, sprinkler and bowl, became predominent. Some stamped sherds were also found from this level. From the late Gupta period, vase, bowl, storage jar, pan with handle, mostly in red ware, were found. The pottery types from the Gahadavala period were few and also in red ware, with or without wash or slip.

The antiquities recovered from the site were mainly of terracotta which included human and animal figurines, sealings, beads, gamesmen, dice, skin-rubber, ear ornaments, etc. A Buddha head and a standing figure of Buddha, fragmentary figure of Buddha(?) in *padmasana,* all in terracotta, were also found.

On the basis of pottery, antiquities and structural remains, the remains at the site could be divided into following four periods:
Period I Kushana/late Kushana *(circa* first to third century AD) Period II Gupta *(circa* fourth to seventh century AD) Period HI Post-Gupta *(circa* eighth-ninth century AD) Period IV Early medieval, Gahadavala *(circa* tenth to twelfth century AD)

83. EXPLORATION *W* DISTRICT BUNOR.—In the course of the village to village survey, N.K. Singh of Agra Circle of the Survey noticed medieval sites at Gandhara and Rampur Pheona and a late medieval temple at Jamal Viddimpur in Tehsil Chandpur.

84. EXPLORATION IN DISTRICT ETAWAH.—In the course of explorations under village to village survey Suresh Singh of the Agra Circle of the Survey noticed the following sites:

Tehsil	*Village/Site*	*Nature of remains*
Etawah	Basrehar	Late medieval temple
-do-	Bela	Grey ware and medieval red ware
-do-	Bhadurpur Lohia	Late medieval temple
-do-	Etawah	Medieval tomb
-do-	Jaswantnagar	Late medieval temple
-do-	Kamet	Late medieval temple
-do-	Lachwahi	Late medieval tomb
-do-	Maharajpur	Medieval temple
-do-	Manakpur Bisu	Medieval temple
-do-	Munj	PG and NBP Wares
-do-	Pachhian Geon	Medieval temple
-do-	Pertalner	Medieval fortress
-do-	Santokhpur Ghat	PG and NBP Wares
-do-	Sarai Ekdil	Medieval mosque
-do-	Sarai Helu	Grey ware and associated red ware

85. EXPLORATION IN DISTRICT LALITPUR.—Ambika Prasad Singh of the Regional Archaeological Unit, Jhansi, U.P. State Archaeological Organization, under the general direction of H.K. Narain brought to light the following sites:

Village	*Nature of remains*
Andhiyari	Medieval sculptures
Banoli	Medieval sculptures
Bakhtar	Medieval sculptures

Village	*Nature of remains*
Bansi	Medieval sculptures and medieval and eighteenth-nineteenth century temples
Barodaraswami	Medieval sculptures
Bharara	Medieval sculptures and *baoli*
Bharatpura	Medieval sculptures
Bucha	Medieval sculptures and temples of eighteenth-nineteenth century
Chorasal	Medieval sculptures
Chitara	Medieval sculptures
Chakranagwas	Medieval sculptures
Dewari	Temples of eighteenth-nineteenth century
Delwara	Medieval sculptures and temple
Dhurwara	Medieval sculptures
Ghisoli	Medieval sculptures and temple
Gora	Medieval sculptures
Gursora	Medieval sculptures and late medieval temple
Gechwara	Medieval sculptures
Harshpur	Medieval sculptures and eighteenth-nineteenth century temple
Jakhora	Medieval sculptures and temple and late medieval temples
Jerware	Medieval sculptures
Jijiyawan	Medieval sculptures
Kargan	Medieval sculpture
Karmu-hara	Medieval sculpture and late medieval temples
Kelwara	Medieval sculpture and late medieval temples
Khera	Medieval sculptures
Lagon	Medieval sculptures, medieval and late medieval temples
Marwari	Medieval sculptures
Masorakhurd	Medieval sculptures and temples and fort
Menwara	Medieval sculpture
Muhara	Medieval sculptures
Nanora	Medieval sculptures and late medieval temple
Noharkalan	Medieval sculptures
Noharkhurd	Medieval sculptures
Panari	Medieval sculptures
Panchora	Medieval sculptures and temple

Village	*Nature of remains*
Pipara	Late medieval temple
Rag Panchampur	Fort and late medieval temple
Aryapur	Medieval sculpture and late medieval temples
Satgata	*Baoli,* medieval sculptures and temple
Sironkalan	Microliths, medieval sculpture and temple, late temple and *baoli*
Sironkhurd	Inscriptions, medieval and lat sculptures and temple and *baoli*
Sorai	Medieval sculptures and temple
Sirsi	Medieval sculptures, medieval and late medieval temple and fort
Silgan	Medieval sculpture and late temple
Thanwara	Medieval sculptures and *fort/garhi*

86. EXPLORATION IN ADWA VALLEY, DISTRICT MIRZAPUR.—Sitala Prasad Singh, under the guidance of R.K. Varma, of the Department of Ancient Indian History, Culture and Archaeology, A.P.S. University, Rewa, explored part of the Adwa Valley, falling under the district and brought to light Upper Palaeolithic sites .at Hatheda, Madhor, Pathraha, Samarmara Dandi (Megha), Semrahva Dandi (Manigada) and Subavan; Epi-palaeolithic sites at Bairihva Dandi (Podhra), Bedaur, Bhatvari, Karaundahagrama, Khatkharihva Dandi (Songara), Kushahva Dandi (Magha), Miruva Daur (Manigada), Piprahiya Dandi (Manigada) and Sukhta; mesolithic sites at Amha, Baherha Dandi (Magha), Batauva Sarhara, Bhaktava Dandi (Songara) and Levarahiya Dandi (Manigada); non-geometric microlithic sites at Badka Daur (Magha), Banjari, Barahula-Badaunhi, Bardahiya Dandi (Manigada), Basuli Dandi (Gurgi), Cherulahava Dandi (Baidha), Dohar, Kolar, Nimahiya Dandi (Pokhra), Purva and Tikuri Dandi; geometric microlithic (with triangles) settlements at Ahugi Khurd, Bhaunrahva Dandi; Chcharahiya Dandi (Baidha), Dhedhi. Hadahiya Dandi (Manigada) Kakrahva Dandi (Magha), Kothi Khurd, Pathrahiya Dandi (Baidha) and Sothiya; geometric microlithic sites (with triangle and trapezes) site at Chanki Dandi; neolithic sites at Tophan Dandi; and megalithic sites at Baheraha Dandi (Magha), Basuli Dandi (Gorgi), Cherulahva Dandi (Baidha), Karaundahagram, Kothi Khurd, Mudhuliya Dandi (Kauljhar), Patharahiya Dandi (Baidha) and Tikuri Dandi (Ahugi Kala).

The tool assemblages comprised of the lunates, blade, burin, scraper, borer, point, etc., made on chert, chalcedony, agate and carnelian, during the upper palaeolithic period; lunate, blade, scraper, borer, on chert, chalcedony, agate and carnelian, during Epi-palaeolithic period; lunate, blade, scraper, borer, point, etc., made on chert, chalcedony, agate, carnelian, etc., during Mesolithic period; lunate, blade, scraper, borer, burin and point, made on chert, chalcedony, agate, etc., during non-geometric microlithic period; lunate, point, burin, borer, blade, scraper and triangle, made on chert, chalcedony, agate, carnelian, etc., during geometric microlithic (with triangle) period; lunate, point,

burin, borer, blade, scraper and trapeze, made on chert, chalcedony, agate, etc., during geometric microlithic (with trapeze) period; lunate, triangle, trapeze, blade, burin, scraper, point, made on chert, chalcedony and agate, during geometric Microlithic (with triangle and trapeze) period; and ring stone, rounded celt with black-slipped, black and red wares, terracotta muller, etc., during neolithic period. During the course of exploration in the district, Girish Chandra Singh of the U.P. State Archaeological Organization, found early medieval images of Kalyanasundaramurti of Siva at Panchmukhi Pahari, situated between Robertsganj and Churk. He also noticed about a dozen painted rock-shelters at Bhamwan, Dakruwaghat in Vijaigarh area.

87. EXCAVATION AT RATURA, DISTRICT PAURI.—K.P. Nautiyal, assisted by B.M. Khanduri, Vinod Nautiyal, D.L. Rajput, S.S. Negi, B.P. Badoni, K.S. Negi, Govind Nautiyal, J.S. Rawat and J.S. Negi of the Department of History including Ancient Indian History, Culture and Archaeology, Garhwal University, carried out excavation at Ratura, 7 km north of Rudraprayag town on the left bank of the Alakananda, with the objective to ascertain the early history of the region as well as impart field-training to the postgraduate students. The trial trench, of 6 X 4 m, taken in the Garhi (fortress) area, revealed two periods of occupation represented by a 1.55 m thick deposit.

Period I (second century BC to second century AD): The earliest settlement was represented by red and plain grey wares. The plain grey ware sherds were too small to indicate their shapes. In red ware, bowls, dishes, vases of various shapes and basins were noticed. The antiquities recovered from this period included iron arrowheads, nails, carnelian beads, glass bangle pieces, antimony rod and tribal copper coins.

Period II (eighth century AD to twelfth century AD): After a gap of about six centuries, the site was reoccupied in the eighth century. The period was marked by structural evidence of the early medieval period. Three dressed stone walls running south-east to north-west were encountered in these levels.

The pottery of this period is similar to that found in the late levels at Ahichchhatra and Hastinapura. The significant pottery types included knife-edged bowls, miniature bowl with an everted featureless rim and a solid pedestal-base, sharply carinated cooking vessels, spouted vases and basins.

88. COPPER ANTHROPOMORPHS, BANKOT, DISTRICT PITHORAGARH.—Maheshwar P. Joshi of the Department of History, Kumaun University, Almora, noticed seven copper anthropomorphic figures, one of which is fragmentary and the rest broken. These artifacts were picked up by villagers from the hill slope at Bankot and were kept in the Gram-Sabha Museum at Bankot.

The anthropomorphic figures, weighing approximately 2.5 to 3.5 kg and measuring approx. 20 cm in length and 22 cm in width, were cast in tray-like single mould. No working/beating was done after casting as a result of which die core of the artifacts remained porous. The rim of the thick "head" portion seems to have been provided with a working edge. The lower portion looking like the tail of a fish has two cone-like feet projected in very low profile. The arms, measuring approximately

8 cm as against 13 cm wide body, have a semi-cylindrical shape.

Maheshwar P. Joshi, assisted by Ramesh Dhapola and Narendra Bankoti, also explored the region and found a temple and water reservoir belonging to early medieval period. The area where the survey was carried out abounds in copper ore which used to be worked in the past.

89. EXCAVATION AT BANDARKHET, DISTRICT TEHRI.—B.M. Khanduri, assisted by Vinod Nautiyal, D.L. Rajput, B.P. Badoni, K.S. Negi, Pradeep Saklani, J.S. Rawat and J.S. Negi of the Department of History including Ancient Indian History, Culture and Archaeology, Garhwal University, carried out excavation at Bandarkhet, one kilometre west of the Tehri town, with a view to ascertain the early history of the region and to understand the chronological feature of the area and also to impart field training to M.A. students. The area is also in the danger of submergence. The trial excavation, carried out in an area of 6 X 4 m, revealed two periods of occupation.

Period I (second century BC to second century AD): The earliest settlement was characterized by the presence of red ware of the fabric ranging from medium to fine. The pottery types were represented by bowls, dishes, vases, basins, jars, spouted jars and some miniature bowls. A number of sherds in this ware were found decorated with stamped and incised designs which included deer, tree, svastika, peacock, *triratna,* leaves, rosettes and chain patterns generally found on sculptures and tribal coins belonging to the period from the third century BC to the second century AD. No structural remains were found.

Period II (eighth century AD to twelfth century AD): After a gap of about 600 years, the site was reoccupied in the eighth century AD. The ceramic industry was represented mainly by red ware in which the knife-edged bowl with a corrugated profile, miniature bowl with an everted featureless rim and a solid pedestal base, sharply carinated cooking-vessels and spouted vases were the common shapes. On the basis of pottery types this period is assigned to the early medieval period.

90. EXCAVATION AT PUROLA, DISTRICT UTTAR KASHI.—K.P. Nautiyal, assisted by B.M Khanduri, Vinod Nautiyal, D.L. Rajput, S.S. Negi, V.P. Hatwal, Rakesh Bhatt, Pradeep Mohan Saklani, Govind Nautiyal, J.S. Rawat and J.S. Negi, of the Department of Ancient Indian History, Culture and Archaeology, Garhwal University, carried out excavation at Purola to ascertain the early history of the region and to excavate the round-shaped mole on the plain surface of the river terrace and also to impart field training to M.A. students.

The excavation revealed a single phase culture of PG Ware alongwith its associated materials. The PGW from this site is confined mainly to the dish and bowl types, the paintings being restricted to horizontal and vertical bands, concentric circles and dots. The associated wares were the red-slipped, black-slipped, grey and red wares, in which the main shapes were dishes, bowls and vases (pl. XLVI A). The other important antiquities included terracotta lion, disc, cone, ball, hopscotch,, bead (ghata-shaped) and potter's stamp. The presence of dental and femur remains of *Equus cabalus* (domestic horse) was an interesting feature.

The excavation of a mound locally known as Entakot, revealed a brick structure, identified as a *Syenachiti.* Measuring 24 X 18 m, it was laid in the east-west direction in the shape of a flying

Garuda, the head being exactly towards the east, the tail towards the west (pl. XLVIB), and the two outstretched wings to the north and south, thus indicating the bird almost in a flying position. A square central chamber, meauring 60 X 60 cm, with a depth of 2.60 m, was found in the middle of the altar. Excavation of this chamber yielded Sunga-Kushana pottery represented by miniature vase, cup, lamp, etc. Five intact miniature red ware bowls were found containing ash, charcoal mixed with bone pieces, sandy clay and copper coins of the Kunindas, datable between *circa* first century BC and second century AD. These coins bore a few symbols, such as the tree-within-railing, svastika, *triratna,* stag, etc., along with a few Brahmi characters of the early Christian era.

The most remarkable discovery from the central chamber was a thin impressed gold leaf showing a human figure standing in frontal position with flowing apparel. Along with this was found a circular gold pendant and a small piece of chain. The human figure was tentatively identified as Agni.

The other significant discovery was an iron axe (21.5 cm long), perhaps indicative of its use in performing the sacrificial rite, connected with the *chiti* (altar).

The bricks, used in the bird-like structure, were generally large sized like 80 X 50 X 11 cm (generally at the corners) and 50 X 50 X 11 cm and 55 X 40 X 11 cm (used in the inner side of the altar).

It was noticed that the recurring floods in the river Kamal had damaged this structure by sweeping away its left wing and the tail portion. Traces of this repair were noticed even in the foundation wall of the tail portion where the repairs were carried out by rubble fillings. This reconstruction of the altar was perhaps suggestive of its long and continuous use for many centuries.

WEST BENGAL

91. EXPLORATION IN THE CHILLAH RIVER VALLEY, DISTRICTS BIRBHUM (W.B.) AND DUMKA (BIHAR).—N.C. Ghosh and S.C. Chakravorty of Visva Bharati, Santiniketan explored the Chillah river valley (24° 6' 10" N; 87° 31' E) to ascertain the archaeological potentiality of the area. The river, originating from the Banaspahari inselburg of the Rajmahal Hills, flows north-west to south-east forming a sort of boundary between Bihar and West Bengal, and ultimately debouching into the river Dawarka, near Tarapith, in District Birbhum.

The exploration revealed an Acheulian channel gravel site at Maluti (Sadarghat, seven middle palaeolithic sites (both gravel bed and surface occurrences), and one open-air mesolithic site in the mid-reaches of the Chillah valley in northern Birbhum and eastern Dumka area.

The lower Palaeolithic tools include handaxes, scrapers and a few unmodified waste, made on quartzite. The typo-technology traits suggested that their Acheulian origin. The *in situ* occurrences of-tools in channel deposit consisting of medium to large gravel indicated their stratigraphical position.

The Middle Palaeolithic sites were found scattered in a stretch of about 4.4 km in the mid-reaches of the Chillah river. The tool assemblages included scrapers, points, borers, notches, etc.

made of silicious materials. The tools were found scattered on the surface or embedded in the second fluvial gravel.

At Shirali Danga, the single Mesolithic site in the Chillah valley, a number of microlithic clusters of finished and unmodified waste was noticed. One such cluster, measuring 1.30 X 1.40 m, subjected to trial digging. It revealed a 10 cm deposit containing artefacts. The artefacts included blade-tools of various types and waste (hammerstones, cores, flakes, etc).

92. EXCAVATION AT MANGALKOT, DISTRICT BURDWAN.—In continuation of the previous season's work *(1987-88,* pp. 111-114), Samir K. Mukherjee, Amita Ray, Anil Chandra Pal, Chitrarekha Gupta, Ashok Datta, Balaram Chatterjee, Netai Chandra Das, and D.K. Chakraborty of the Department of Archaeology, University of Calcutta, resumed excavation at Mangalkot with the objectives to understand the nature of the introduction of iron in the chalcolithic phase, to confirm the culture-sequence of the site achieved through earlier excavations, to understand the relations between wall, and the brick well and to trace out the peripheral extension of the Black-and-red Ware culture in the neighbourhood of Mangalkot.

The area taken up for excavation, in order to confirm the introduction of iron at the basal level, revealed the evidence of iron in the form of ingot, iron slags and finished tools like arrowheads and points, indicating the use of iron in the Chalcolithic phase from the very beginning (pl. XLVII A). The pottery, found from this level, included Black-and-red, Red polished, lustrous red and fine polished black-slipped, cream-slipped wares and rusticated ware in black colour. The shapes of the pottery were the usual utilitarian shapes like *handi,* vessels and basins, channel-spouted and carinated bowls, dish-on-stand, etc. The pottery was of both painted and plain varieties. The painted designs included dots, dashes, criss-cross motifs and sigmas in black on red and in white on black. The other interesting finds at this level include a huge quantity of bone-artifacts like lunates, points, daggers, knives; terracotta discs, bangles and beads of semi-precious stones. Rammed floor-levels paved with potsherds and cow-dung were noted in this level.

Period II (Transitional), represented by a deposit of 0-39 m, was characterized by the occurrence of red pottery of fine variety, represented by incurved miniature bowl, black-and-red, black-slipped and grey wares. Iron tools and slag were found in abundance.

Period III, coeval with the Maurya-Sunga phase, yielded coarse variety of NBP, red-slipped and dull red wares, cast coins, and beads made of semi-precious stones and terracotta. The excavation revealed remains of lime floor with foundation made of pottery chips, ghuttings, and rammed mud mixed with sand. Evidence of the existence of huts of wattle and daub construction was found in the debris.

Period IV was represented by red slipped sturdy pottery of the Kushana period, at times with stamped designs. The shapes included footed bowl with a vertically sharpened rim and side, tapering to flat thickened base, lid, spouted jar, long-necked *surahi,* and sprinklers. The occupational deposit lying over the earlier phase was distinguished by large-scale building activities in brick (24 X 26 X 6 cm; 38 X 28 X 5 cm; 40 X 27 X 7 cm). Two constructional phases were recognized. The notable finds consisted of terracotta figurines, flesh-rubber and beads of carnelian, agate, jasper and crystal.

Period V was characterized by the structural activities of the Gupta period represented by brick structure having well laid-out floors of rammed brick. The ceramic industry was represented by grey and thin fabricated red-slipped wares, often with moulded designs. The shapes included bowls, vessels, basins, spouted vase, etc. A few seals and sealings, beads made of semi-precious stones, and copper objects were the antiquities recovered from this period.

The deposits overlying those of period V were found to be disturbed due to different reasons, perhaps during the post-Gupta period. The period however revealed ruins of brick structures. At a new site, locally known as Kachharidanga close to the confluence of the rivers Ajay and Kunur was also subjected to excavation (pl. XLVII B). From the available material remains recovered from the excavation, it appears that the site was in occupation from the late medieval period to the days of the East India Company. The ceramic industry was represented mainly by plain red, grey and black wares having common shapes such as carinated vessels, dish, wide-mouthed heavy rimmed jar, globular jars, vases and saucers. Dishes made of slate stone were an interesting find. Many of the plain and unslipped ware contained mica-dust in plenty. Beads of different shapes and sizes and made of carnelian, agate, jasper, chert, crystal, shell and terracotta, were found in profusion. The presence of micro-beads was an interesting evidence. The discovery of large number of beads in different stages of manufacture along with the remains of the raw materials indicated the possibility of the site being a bead-manufacturing centre. The upper levels of this site yielded sherds of glazed ware, ordinary mat red and buff ware.

93. EXCAVATION AT BALLALDHIPI, DISTRICT NADIA.—In continuation of the previous year's work *(1987-88,* pp. 114-115), S.S. Biswas of the Calcutta Circle of the Survey resumed excavation at Ballaldhipi and exposed further the northern and southern walls. The subsidiary shrine, abutting on the southern boundary wall was also exposed during this season.

II. EPIGRAPHY

SANSKRITIC AND DRAVIDIC INSCRIPTIONS[1]

ANDHRA PRADESH

1. KALYANA CHALUKYA INSCRIPTION, HEMAVATI, DISTRICT ANANTAPUR.—This inscription, in Kannada language and characters of the twelfth century AD, belongs to the reign of Chalukya Bhulokamalla (pl. XLVIII). It refers to the king's feudatory *mahamandalesvara* Irumgoladeva and seems to register the provision made for the conduct of worship and perpetual lamp to the deity Nolambesvara, on the occasion of Uttarayana-samkranti by his queen. It also refers to the reconstruction of the temples of Nolambesvara, Vishnu, Durga, Ekkalesvara, etc., by her.

2. JAINA PILLAR INSCRIPTION, MUNUGODU, DISTRICT GUNTUR.—This inscription, in Telugu characters of early twelfth century AD on a granite pillar, records in Telugu verse in *utpalamala* metre renovation of a temple dedicated to Sitajinesvara (Sitalanatha) by one Gaichamaboya Kattadu, a subordinate of the Velanati chief Gonka.

It also records the donation of land to the said temple in the vicinity duly demarcating its boundaries, by Mahamandalesvara Velanati Gonka in the thirty-seventh regnal year of Vishnuvardhana II corresponding to AD 1107.

The inscription further refers to the existence of a Jaina Basadi, known as Prithvitilakamu Anandaraja Chitta Samtoshamu and ends with imprecatory statement.

3. PLATES OF ANANTAVARMA, STATE MUSEUM, DISTRICT HYDERABAD.—A copper plate set of Eastern Ganga king Anantavarma dated in Ganga era 454 was noticed among the copper plate records preserved in the State Museum, Hyderabad. The copper plate in Sanskrit language and Oriya script records the gift of a village to the Brahmins. Another copper plate of Anantavarma Chodaganga, dated S 1049, in Telugu language and Telugu-Kannada script, records the grant of Kolaramu village to the military general Gangana of the Ayya family for his outstanding military service. The third copper plate dated S 1308, belonging to Vijayanagara king Harihara in Nagari script and Sanskrit and Kannada languages, records the gift of some *vrittis* of land to Brahmanas of the Pampakshetra. The king Harihara is praised for his proficiency in the Sastras taught by his guru Vidyaranyasvami.

4. KANNADA INSCRIPTION, GADWAL, DISTRICT MAHBUBNAGAR.—This inscription, engraved on stone built into the *adhisthana* of the Yoganandisvara temple, is in Kannada language and characters

[1] Information from: 1,3, 7,10-11, 13, 15-16, 18-19, K.V. Ramesh assisted by Madhav N. Katti, M.D. Sampath, S.P. Tewari, N. Nanjunda Swamy, S. Nagarjuna, S. Swaminathan and S. Rajavelu of the Epigraphy Branch of the Survey; 2, Archaeological Museum, Amaravati; 4, 6, Department of Archaeology and Museum, Andhra Pradesh; 5, 8-9, Hyderabad Circle of the Survey; and 12, 14, 17, Department of Archaeology and Museums, Tamil Nadu.

of the eleventh-twelfth centuries AD. It states that Padmananda-maladhari made a gift to a Jaina temple named Tirtha-basadi built by Parisva-Bhattaraka belonging to Mula-sangha, Kondakumdanvaya, Desiyagana and Postaka-gachcha.

5. LABEL INSCRIPTION, KUDAVALLI SANGAMESVARA, DISTRICT MAHBUBNAGAR.—This label inscription engraved on a short pillar stump in characters of fifth-sixth century AD, mentions the name 'Kajugachari'. Another Telugu inscription in eleven lines engraved on a rectangular slab refers to one Potaraju who made some endowments to the lord Sangamesvara.

6. INSCRIPTION, GADIPADDAPUR, DISTRICT MEDAK.—This inscription, dated S 1020, belongs to Tribhuvanamalla Vikramaditya and records the gift of land to the god Isvara of Billakallu by the queen Malaladevi of the chief Ahavamalla.

KARNATAKA

7. HOYSALA INSCRIPTION, SIVAGANGA, DISTRICT BANGALORE.—This inscription in Kannada language and characters of the twelfth century AD, is engraved on a slab set up in front of the Gangadharesvara temple. It refers to the reign of Hoysala Narasimhadeva and states that *mahapradhana, sarvadhikari, senadhipati, hiriya-hadavala* Chokimayya, son of *hiriya-hadavala* Bappayya, raised a *mandapa,* for the welfare of Tammavva and Mallikava (pl. XLIX A).

8. ASOKAN EDICTS, SANNATI, DISTRICT GULBARGA.—Edicts discovered on *pitha* slab (2.33 X 1.21 X 0.30 m) of Mahakali shrine in Chandralamba temple complex, have been identified as of Asoka Edicts XII and XIV (pl. XLIX B).

Another set of Asokan Edicts on the other side of the same *pitha* were also discovered while removing it from the original place for preservation. These were identified as the Separate Rock Edicts I and II (pl. XLIX C), the texts of which are already known from similar edicts at Dhauli and Jaugada (Orissa).

9. SATAVAHANA INSCRIPTION, SANNATI, DISTRICT GULBARGA.—A Satavahana inscription was noticed on two faces of a rectangular limestone slab which mentions the name of king Siva Sri Pulumavi.

ORISSA

10. PRAKRIT INSCRIPTION, LALITAGIRI, DISTRICT CUTTACK.—This Prakrit inscription in Brahmi characters of the first-second century AD seems to record the completion *(samavita)* of the seat *(asana)* of Adatadamana probably jointly by Vinaya, a resident of Vadhamana, a certain Vinayadhara and his disciple Budhitini, a resident of Aggotisila (pl. L A).

TAMIL NADU

11. Pandya inscription, Nakkaneri, District Kamarajar.—This inscription, in Tamil language and Vatteluttu characters, is engraved on a rocky outcrop in the village. It is dated in the fifteenth year (AD 960-61) of the reign of the Pandya king Solan-talaikonda-Vira Pandya. It registers a gift of seventy-five sheep for a perpetual lamp to the deity Narayanasvami in the temple *(srikoyil)* named Chulamani-vinnagar on the hill at the north of Sridevi-ammacha-chaturvedimangalam, a *devadana-brahmadeya* in Andanadu, by Tennavan Uttaramantri *alias* Chulamani-kilavan. Ulagankurralam, an army chief of Ammadevi-chaturvedimangalam, is stated to have received the gift and undertaken to maintain the lamp (pl. L B).

12. TAMIL INSCRIPTION, VIKKIRAMANAGALAM, DISTRICT QUAID-E-MILLET.—This one-line Tamil inscription in Brahmi characters of first century AD, was noticed in a natural cavern near the village in Nilakkottai taluk. The inscription which reads 'Erayal Arakayatan Covviton' informs us that a certain Arakayatan of village Erayal had caused this bed to be made.

13. CHOLA INSCRIPTION, THANJAVUR, DISTRICT THANJAVUR.—This inscription, engraved on a pillar found in an excavated site, is in Sanskrit language and written in Grantha characters of tenth century AD. It gives a long *prasasti* of the Chola Rajaraja I.

14. COPPER-PLATE CHARTER OF RAJENDRA CHOLA, DISTRICT THANJAVUR.—This charter consists of fifteen leaves with inscription on -both sides and a ring with the royal seal of the Cholas. The inscription in Sanskrit records the. construction of the great temple of Thanjavur by Rajaraja I and the great temple of Gangaikondacholapuram by his son and successor Rajendra I. This plate also refers to a gift of land by the king Rajendra to the Siva Temple which was built by Sarvasiva-Acharya in his twenty-fourth regnal year.

15. PANDYA INSCRIPTION, CHAKKARAPPALLI, DISTRICT THANJAVUR.—This inscription, engraved in Tamil language and characters, is dated in the seventeenth regnal year (AD 1267-68) of the Pandya king Sadaiyavarman Sundara Pandya and records the consecration of the god and goddess at Tiruchchakkarapalli and the provisions made for conducting the Chittirai festival to these deities by the mercantile organisations *(vaniga-nagarattar)* of Kannanurakoppattupadinenbhumi and Irandukarai-nadu.

16. VIJAYANAGARA COPPER-PLATE INSCRIPTION, DHARMAPURAM, DISTRICT THANJAVUR.—This charter, preserved in the *matha* at Dharmapuram, is written in Tamil language and script and belongs to the reign of the Vijayanagara king Krishnadeva-maharaya. Dated Saka 1435 (AD 1513), it registers a royal grant of thirty *veli* of lands in the village Radhanallur in Tirukkalaumalap-parru and the income from Tirumullaviayal-parru to meet the expenses for conducting the worship and services of the deity Mullaivananatham-udaiya-tambiranar of Tirumullaiveyal, situated between the rivers Kaveri and Kollidam in same *parru* and for the merit of the king.

17. TAMIL INSCRIPTION, THIRUMALAI, DISTRICT THIRUMAGANAR.—This Tamil inscription in Brahmi characters which is datable on palaeographical grounds to second century BC reads as follows: *"Ekkatturu Kavithikan koria pali"* meaning that the bed was caused to be made by Kavithikan of Ekkattur. The title Kavithi is known to have been conferred on the Royal Officers by the king. Hence it is obvious that this gift was made by an official.

UTTAR PRADESH

18. MAUKHARI COPPER-PLATE, DEVAKALI, DISTRICT GHAZIPUR.—This copper-plate charter, originally from the above village and now preserved in the State Museum at Lucknow, is in Sanskrit language and in late Brahmi characters of the sixth century AD. It records the grant of the village Varggashana of the district of Panchalaka by king Isanavarman on the tenth day of the bright fortnight of the month, of Vaisakha in the (Vikrama*) year 632 (AD 575). This date helps us to corroborate the other events of the political history of the Maukharis.

19. STONE INSCRIPTION, MANGHER-CHHATIKARA, DISTRICT MATHURA.—This inscription, now preserved in the State Museum at Mathura, is in the mixture of Prakrit and Sanskrit languages and written in early characters of the second century AD. The record is dated in the year 116 of the reign period of the Yavanaraja and refers to the excavation of well and tank by the mother of Birbala, called Rohogniya, the wife of Ghoshadatta, a Sarthavaha brahmana, who belonged to Maitreya-sagota. This deed was executed for the enhancement of the merit of Birbala, his wife Bhaguriya and sons Suradatta, Rishbhadeva and Viradatta. The year given probably refers to the Saka era and thus the Christian equivalent would be AD 194.

ARABIC AND PERSIAN INSCRIPTIONS[1]

ASSAM

1. INSCRIPTION OF THE SULTANS OF BENGAL, MATEHAGHAR, DISTRICT SIBSAGAR.—This epigraph of the time of Sultan Alaud-Din Husain Shah, found at Borgohan Bill by the side of the river Diku, Matehaghar, is written in Arabic in Thulth characters. It refers to the construction of a Jami mosque in AH 915 (AD 1509-10). This is a new and important inscription being the second record of the Sultans of Bengal in Assam showing extension of their power upto this part of the country.

BIHAR

2. INSCRIPTIONS OF THE MUGHALS, LAKHANPUR, DISTRICT BHAGALPUR.—A metrical record in Persian, in Nastaliq characters, belonging to the reign of Mughal emperor, Shah Jahan, states that a

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[1]Information from N.M. Ganam, assisted by MP. Khan, S.S. Hussain, M.Y. Quddusi, M.I. Quddusi and G.S. Khwaja of the Epigraphy Branch of the Survey, Nagpur.

mosque was constructed in Khurramabad by Farasat Khan in AH 1051 (AD 1641-42). The place-name Khurramabad seems to be on account of the association of prince Khurram (i.e. Shah Jahan). Another inscription from the same place of the time of Aurangzeb records the construction of a mosque by Nur Afshan(?) in AH 1073 (AD 1662-63).

3. MISCELLANEOUS INSCRIPTION, BHAGALPUR, DISTRICT BHAGALPUR.—The epigraph refers to the construction of a mosque by Roshan' AH in AH 1280 (AD 1863-64).

HARYANA

4. INSCRIPTION OF THE MUGHALS, SARAI MUHAMMADPUR, DISTRICT GURGAON.—This metrical epigraph of Aurangzeb records the construction of a *Sarai* (i.e. an inn) designated as *"Sarai Laskharabad"* by Muhammad Lashkari, son of Firuz Khan Mewati in the year AH 1107 (AD 1695-96).

5. INSCRIPTION, FARRUKHNAGAR, DISTRICT GURGAON.—This inscription found lying loose near the grave of Faujdar Khan, originally on the gate of the fort, mentions *"Qila-i-Faujdar Khan"* (i.e. the fort of the Faujdar Khan) giving the date as AH 1150 (AD 1732-33) which seems to be the date of completion of the fort.

6. MISCELLANEOUS INSCRIPTION, HANSI, DISTRICT HISSAR.—This inscription fixed on a tomb records the death of Mukhtar Bahu Sahiba wife of (Col. James) Skinner who died in AH 1274 (AD 1855).

7. MISCELLANEOUS INSCRIPTIONS, PANIPAT, DISTRICT KARNAL.—This inscription from Panipat states that the tomb belongs to Nawwab Muqarrab Khan Kairanvi (i.e. of Kairana in Uttar Pradesh) who was the minister *(Vazir)* of Jahangir. The date AH 1053 (AD 1643-44) given in the record appears to be the date of completion of the tomb. The other epigraph from the same place on the facade of Naqqar Khana states that it was built by Shamsud-Daula Bahadur Neknam in AH 1136 (AD 1723-24). One more inscription from the same place on one of the gates of the city mentions *"Bab-i-Faid-i-Nawwab Sadiq"* (i.e. gate of bounty of Nawwab Sadiq) yielding the date AH 1149 (AD 1736-37), for the construction of the gate.

8. MISCELLANEOUS INSCRIPTIONS, DHARSON, DISTRICT MAHENDRAGARH.—This metrical Persian inscription in Naskh characters from Dharson states that Shaikh Hamza departed from the world in AH 955 (AD 1548). It further states that Shaikh Jamal, the son and spiritual successor of the saint also died, after fifteen years in AH 970 (AD 1562-63). The importance of this record lies in the fact that it provides us authentic date of demise of Shaikh Hamza, whereas some chronicles mention the date as AH 957 (AD 1550-51). Another inscription from the same place fixed on the facade of a building near the *dargah* complex mentions that the edifice known as *"Shah Hamza Chishti Mahal"*

was built in AH 1124 (AD 1712-13) by Muhammad Abdullah, the spiritual successor (Sajjada Nashin) of the *dargah.*

9. INSCRIPTION, REWARI, DISTRICT MAHENDRAGARH.—This inscription, composed by Rafiqullah Qadiri and set up by him in AH 1305 (AD 1887-88) provides an important information that this is the grave of Sayyid Ibrahim who was *mansabdar* of 12,000 during the time of Mahmud Shah (i.e. Sultan Mahmud of Ghazna) and got martyrdom while fighting against infidels in AH 420 (AD 1029-30).

10. INSCRIPTION OF THE MAMLUKS, ROHTAK, DISTRICT ROHTAK.—This fragmentary and bilingual inscription, found in Khokrakot, a locality of Rohtak while excavation of a site is now kept in the Department of History, M.D. University, Rohtak. It records the construction of some edifice during the reign of Sultanul Azam, Ghiyathud Dunya Wad-Din Abul Muzaffar Balban. Unfortunately the portion containing main text including date is missing.

11. INSCRIPTION OF THE MUGHALS, ROHTAK, DISTRICT ROHTAK.—Belonging to the Mughal emperor Humayun, the epigraph records the construction of a mosque at the instance of Mir Muhammad Ali, a nobleman of high dignity and by the efforts of Qadi Bahaud-Din (son of) Sadu'd-Din, the administrator *(Hakim)* of the town *{qasba)* of Rohtak. The striking feature of the record is that it contains the name of the consort of the emperor alongwith his name which is generally not found in Perso-Arabic inscriptions (pl. LI A).

12. INSCRIPTION, MEHM, DISTRICT ROHTAK.—A damaged inscription dated AH 907 (AD 1502) records the completion of the tomb *(maqbara)* of a saintly person whose name is mentioned as Sayyidus Sadat (the remaining part could not be made out).

KARNATAKA

13.EPITAPH, BABA BUDHAN HILLS, DISTRICT CHIKMAGALUR.—This epitaph records the demise of Budhan Ali who was the native of Budhan Nagar (a village nearby) in AH 1266 (AD 1850).

14. INSCRIPTION OF ADIL SHAHIS, HONNALI, DISTRICT SHIMOGA.—A fragmentary and damaged inscription of Muhammad Adil Shah records the construction of a bastion in AH 1060 (AD 1649-50) by Tauqir (?) Khan. The next inscription of die time of Sikandar Shah states that Hoenhalli (as spelt in the text) was granted by the king to Diyanat Rao whose son Govind Rao built a bastion *(burj)* and named it *Diyanat Burj* in Shuhur year 1073 (AD 1673).

15. MISCELLANEOUS INSCRIPTION, SHIKARPUR, DISTRICT SHIMOGA.—The inscription records the construction of an enclosure around the grave of Bahadur Khan who died in AH 1213 (AD 1798-99).

RAJASTHAN

16. INSCRIPTION, AJMER, DISTRICT AJMER.—This bilingual inscription issued during the governorship of Rao Bahadur Ingliya states that as six and half villages had been granted to the *Khadims* (attendants) of the dargah (of Khwaja Muinu'd-Din Chisti of Ajmer) since long, hence it is ordered that the officials ,Hindus or Muslims, should not extract *Nazrana* (offering) and *Jurmana* (fine) from the residents of those villages. It ends with an imprecation against the violators. It also mentions that the inscriptional slab (containing this order) was set up in AH 1224 (AD 1809) under the supervision of Rao Sahib Pandru Rang Jiv.

TAMIL NADU

17. INSCRIPTION, DINDIGAL, DISTRICT ANNA.—This epigraph records the death of a pious lady named Nawwab Amirun-Nisa Begam, wife of Nawwab Ali Rada Khan Bahadur in AH 1187 (AD 1773-74)..

18. INSCRIPTIONS OF THE MUGHALS, KANCHIPURAM, DISTRICT CHENGALPATTU.—Of the three inscriptions found in Kanchipuram belonging to the reign of Aurangzeb, the first metrical record written in beautiful Thulth and Naskh style states that during the governorship of Nawwab Daud Khan one Shaikh Islam constructed an Idgah in AH 1116 (AD 1704-05). It mentions Ghaibi, as composer and Muhammad Husain as scribe. The other epigraph which is also dated AH 1116 (AD 1704-05) and of the time of governorship of Nawwab Daud Khan states that the same Shaikh Islam founded a market *(painth)* and named it as Islampur. It further states that the income accrued from the market would be spent on free kitchen to the poor. It also mentions that one Yella Palla Thulkarni and his progeny would collect the amount and spend it for the said purpose. It ends with the curse of God on violators. The last inscription (of the time of Aurangzeb) dated AH 1117 (AD 1705-06) which is inscribed on the reverse side of the above record contains an agreement *(Qaul)* according to which the residents of Islampur are informed that the first grade weaving manufacturers would pay revenue at the rate of two *falams* whereas the second grade manufacturers one *falam* every month. Similarly the shopkeepers of the front row would pay *two falams* and those of Wednesday market would pay as per usual practice and that the revenue accrued from the above sources should be deposited to the Government exchequer. It ends with the curse of God to the violators.

19. INSCRIPTION, KANCHIPURAM, DISTRICT CHENGALPATTU.—The epigraph assigns the construction of a mosque to Sayeed Khan Bahadur in AH 1131 (AD 1718-19).

20. INSCRIPTIONS, GAD AMBUR, DISTRICT NORTH ARCOT.—Of the two inscriptions from Gad Ambur, executed by Abu Turab Shaibani and composed by Qani, the first epigraph states that on the demise of Mir Hashim, a tomb was constructed under the supervision of Mir Muhammad Husain *alias* Sayyid Kiyani in AH 1118 (AD 1706-07). The other record assigns the construction of a mosque to Mir Safdar in AH 1120 (AD 1708-09).

21. MISCELLANEOUS INSCRIPTIONS, LALAPET, DISTRICT NORTH ARCOT.—The epigraph from Lalapet states that the grave is that of Sayyid Karim Muhammad, son of Sayyid Shah Qasim al-Qadiri, a saintly person, who died in AH 1225 (AD 1810). The other inscription from the same place records the construction of a beautiful mosque by Sayyid Sibghatullah in AH 1232 (AD 1816-17). A bilingual inscription from the same place assigns the construction of a *sarai* for the travellers to the said person, Sayyid Sibghatullah in AH 1239 (AD 1823).

22. INSCRIPTION OF NAWWABS OF ARGOT, RANIPETTAI, DISTRICT NORTH ARCOT.—The epigraph records the demise of one of the family members of Nawwabs of Arcot, Jan-i-Jahan Khan, son of Nawwab Khairud Din Khan who was the brother of Samsamud Daula Bahadur, in AH 1212 (AD 1797-98).

23. MISCELLANEOUS INSCRIPTIONS, RANIPETTAI, DISTRICT NORTH ARCOT.—This inscription appears on a ruined mosque from Ranipettai, records the construction of mosque by Shaikh Abdul Wahhab Haq Numa in AH 1133 (AD 1720-21). The other inscription from the same place records the demise of Hadrat Begam Karimun-Nisa (wife of Nawwab Khairud-Din) who died in AH 1212 (AD 1797-98). One more inscription from the same place refers to the death of Badshah Bibi in AH 1257 (AD 1841-42). The lady seems to be one of the members of the local ruling family.

24. INSCRIPTION, VANIVAMBADI, DISTRICT NORTH ARCOT.—This metrical Persian inscription records the construction of tomb of Mastan Wali in AH 1262 (AD 1845-46) by Shaikh Madar with the cooperation of Shaikh Ismail.

UTTAR PRADESH

25. TUGHLUQ INSCRIPTIONS, SAHAR, DISTRICT MATHURA.—This new and important inscription in Persian language and executed in Naskh characters from Sahar belongs to the reign of Sultan Ghiyathud-Din Tughluq Shah, the founder of the Tughluq dynasty (pl. LI B). It states that Mahmud (son of) Uthman Khalj, out of his own money, constructed the mosque under the supervision of Shams (son of) Mir Husaini in AH 725 (AD 1325).

26. INSCRIPTION OF THE LODIS, SAHAR, DISTRICT MATHURA.—This damaged bilingual inscription found lying loose from Sahar, is a new record in this region of Sultan Sikandar Lodi, son of Bahlul Shah (pl. LI C). It records the construction of Jami mosque in the town *(qasba)* of Sahar during the time of Masnad-i-Ali Azam Humayun Alawal Khan at the instance of (name lost) in AH 920 (AD 1514-15).

III. NUMISMATICS AND TREASURE TROVE[1]

GUJARAT

1. MUGHAL COINS, TAJPAR, DISTRICT BHAVNAGAR.—A hoard, comprising the silver coinage of the late Mughal rulers, Ahmad Shah, Muhammad Shah, Shahjahan II and Farrukhsiyar, was found from village Tajpar in Taluk Botad of the district. Most of these coins were issued from Ahmedabad and Surat mints.

2. GOLD ORNAMENTS AND SILVER COINS, NALIA, DISTRICT KACHCHH,—Gold ornaments and silver coins were found from village Naliya in Taluka Abadasa of the district.

3. KSHATRAPA COINS, DHOLARA, DISTRICT RAJKOT.—Thirty-two coins either on bullion or on silver belonging to the Kshatrapa rulers, Rudrasena and Vijayasena, dated to second-third century AD, were found in the village Dholara of the District.

MADHYA PRADESH

4. SILVER AND COPPER COINS, MANDU, DISTRICT DHAR.—Pre-Mughal, Mughal and Maratha coins were found from Mandu in the district.

5. COPPER COINS, TIGAWAN, DISTRICT JABALPUR.—Mughal copper coins were found near the Durga temple at Tigawan.

WEST BENGAL

6. SILVER COINS, SERAMPORE, DISTRICT HOOGHLY.—Forty silver coins, belonging to the Sultan ate period, were unearthed from Chatra Telipara Bhagarbagan of the district.

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[1] Information from: 1-3, Department of Archaeology, Gujarat; 4-5, Bhopal Circle of the Survey; and 6, Calcutta Circle of the Survey.

IV. OTHER IMPORTANT DISCOVERIES

ANDHRA PRADESH

1. ROCK-SHELTERS, BUDAGAVI, DISTRICT ANANTAPUR.—The Registering Officer of the State Department of Archaeology, Andhra Pradesh located rock-shelters and rock paintings at Budagavi village.

2. BRONZE OBJECTS, CHANDRAGIRI, DISTRICT CHITTOOR.— C. Devendra Rao of the Hyderabad Circle of the Survey discovered bronze images of Vishnu, five plates and five camphor burning handles of copper alloy in Chennakesavasvami temple while resetting the stone floor of the mukha-mandapa of the temple. These objects are datable to Vijayanagara period.

3. STONE LAMP, YAGANTI, DISTRICT KURNOOL.—G. Hanumantha Rao of the Hyderabad Circle of the Survey noticed a three-tiered stone lamp in Umamahesvarasvami temple datable to eighteenth century (pl. LII A).

4. PREHISTORIC ROCK-SHELTER, DUPADUGATTU, DISTRICT MAHBUBNAGAR.—The State Depart ment of Archaeology and Museums, Andhra Pradesh discovered rock-shelters having paintings of elephant and deer.

5. TEMPLE REMAINS AND SCULPTURES, THONDAWADA, DISTRICT TIRUPATI.—The State Depart ment of Archaeology and Museums, Andhra Pradesh, located an *adhishthana* of a temple along with the architectural remains include *kumbha panjaras, salakoshthas* and niches and sculptures including warriors and yakshas assignable to the Vijayanagara period.

Sculptures of Virabhadra, Sakti and Vinayaka bearing Telugu inscriptions and *panchaloha* idols of Sri Subrahmanyasvami were noticed during the survey of villages coming under the submergence of Somasila Project.

6. KAKATIYA TEMPLE, WARANGAL, DISTRICT WARANGAL.—L.D.P. Vittal of the Hyderabad Circle of the Survey located a temple abutting the fortification wall of the Warangal fort.

7. INSCRIPTION, PEDDAVEGI, DISTRICT WEST GODAVARI.—The Hyderabad Circle of the Survey discovered Eastern Chalukyan inscription in Telugu characters on three faces of a loose pillar datable to tenth-eleventh century AD.

BIHAR

8. UPPER PALAEOLITHIC SITE, BODHGAYA, DISTRICT GAYA.—B.R. Mani of the Survey noticed Upper Palaeolithic tools comprising scrapers, points and blades of quartzite and chert in the vicinity of the Dongeshwari cave where, according to local tradition the Buddha had meditated.

9. IMAGE OF GANESA, RAMGARH, DISTRICT ROHTAS.—B.L. Nagarch of the Temple Survey Project of the Survey discovered a beautiful image of four-armed Ganesa, seated in *lalitasana* near the flight of steps leading to the Mundesvari temple. The image is assignable to seventh century AD.

DELHI

10. PROTOHISTORIC SITE, BADLI-KI-SARAI, DELHI.—B.R. Mani of the Delhi Circle of the Survey discovered a number of Painted Grey Ware sherds and other associated pottery from the mound of Gordon Highlanders coloumn.

GUJARAT

11. JAINA SCULPTURES, BHADRUDA, DISTRICT AHMEDABAD.—The Department of Archaeology and Museums, Government of Gujarat, discovered four sculptures of Jaina Tirthankaras, Mahavira, Santinatha, Parsvanatha and one unidentified, measuring 19 X13 X 4 cm, 21 X 84 X 6'/2 cm, 21 X 9 X 6 cm and 32 X 20'/2 X 05 cm respectively. All are made out of schist assignable to *circa* eighth-ninth century AD.

12. JAINA SCULPTURES, HADAD, DISTRICT BANASKANTHA.—The Department of Archaeology and Museums, Government of Gujarat, noticed the sculptures of Risabhanatha (?) measuring 50 X40 X 17 cm, Mahavira measuring 50 X 41 X 17 cm made out of white marble and a pedestal having *Yakshi* Padmavati measuring 20 X 60 X 20 cm made out of schist. All are assignable to twelfth-thirteenth century AD.

13. BRAHMANICAL SCULPTURES, VADNAGAR, DISTRICT MEHSANA.—The Department of Archae ology and Museums, Government of Gujarat, discovered an *Ekamukha* Siva *linga* and images of Siva and Ganesa made out of schist in the course of digging operation for irrigation purposes. The *Ekamukha* Siva *linga* is assignable to fifth century AD while the rest belong to eighth-ninth century AD.

14. JAINA SCULPTURES, HIMMATNAGAR, DISTRICT SABARKANTHA.—The Department of Archae ology and Museums, Government of Gujarat, noticed two figures of Neminatha measuring 28 X 13 X 10 cm and 20 X 24 X 10 cm respectively and figures of Ajitnatha and Chandranatha measuring 7 X 18 X 8 cm and 28 X 22 X 10 cm respectively. These are made out of schist assignable to sixteenth century AD.

15. PREHISTORIC TOOL, CHUNAVADI, DISTRICT SURAT.—A lower palaeolithic scraper was noticed while exploring the Ambica river bed by the Department of Archaeology and Museums, Government of Gujarat. The scraper is thick and its working edge is blunt.

HARYANA

I6.S1LVER COINS, DAHA, DISTRICT KARNAL.—Inderjeet Singh of the Chandigarh Circle of the Survey discovered thirty-two silver Mughal coins at Daha while digging the foundation of the Kos Minar.

17. SILVER COIN, DUMYANA, DISTRICT KARNAL.—Kanwar Singh of the Chandigarh Circle of the Survey discovered one silver coin of Nadirshah at Dumyana in the course of villlage-to-village Survey.

18. SCULPTURE, KHOKHRAKOT, DISTRICT ROHTAK.—Jasmer Singh of the Chandigarh Circle of the Survey discovered a female bust assignable to Kushana period.

19. COPPER COINS, MEHM, DISTRICT ROHTAK.—The Chandigarh Circle of the Survey reported the discovery of fourteen copper coins of the British period while removing the earth accumulation from the *baoli* area at Mehm.

JAMMU AND KASHMIR

20. STONE SCULPTURES, MEMORIAL STONES AND INSCRIPTION, KULAR SALAR, DISTRICT ANANTNAG.—R.C. Agrawal, R.S. Fonia, A.K. Pandey and R.K. Jatta of the Srinagar Circle of the Survey discovered a sculpture of Ganesa, torso of a human figurine, sixteen memorial stones assignable from ninth to twelfth century AD and a part of Brahmi inscription (67 X 44 X 20 cm) in Sanskrit language datable to the beginning of eighth century AD.

21. KUSHANA SITE AND EARLY MEDIEVAL TEMPLE, SHIR MIRHAR, DISTRICT BARAMULA.—S.N. Kesarwani and R.K. Jatta of the Srinagar Circle of the Survey discovered a platform of a temple datable to ninth-tenth century AD over a Kushana site.

22. KUSHANA SITE, EARLY MEDIEVAL TEMPLE AND MEMORIAL STONES, KHUNAMUH, DISTRICT PULWAMA.—S.N. Kesarwani of the Srinagar Circle of the Survey noticed a Kushana site and early medieval platform of a temple at the village Khunamuh. Besides, a dozen memorial stones of eighteenth-nineteenth century were also noticed by him which are now lying in the compound of modern Siva temple in the village.

23. FORT AND GROUP OF TEMPLES, KHAMBAH, DISTRICT RAJAURI.—S.N. Kesarwani, Vijay Shankar, A.K. Pandey and Puran Singh of the Srinagar Circle of the Survey noticed a fort datable to early nineteenth century. The fort is situated on an isolated hill. It is irregular on plan measuring 250 x 60 m and having 2.50—3.00 m high fortification wall with circular and octagonal bastions for security guards at different intervals. It has an arched entrance in between on the south-east corner and a 50 m deep well in the midst of the fort. A circular bastion at its northern end was used as an emergency exit. There are some ruins of residential buildings which have been noticed along with the fortification wall.

Besides, they also noticed a group of Siva temples datable to tenth century AD. Four of these are facing east and raised on a common platform measuring 20 x 8 m. All these temples enshrine Siva-/mga on *Gauri-patta.* One of the temples is survived with a trefoil arched entrance and door-jambs with two *dvarasakhas.* The fifth temple facing north is isolated and partly jock-cut. Two *amalakas* and other architectural members at the site suggest that the temples had curvilinear *sikharas.* These temples mark a synthesis of Kashmiri and north Indian temple architectural style.

24. UNIQUE INSCRIBED STONE MOULD FOR CASTING TERRACOTTA PLAQUES, NARANAG, DISTRICT SRINAGAR.—B.R. Mani of the Institute of Archaeology of the Survey noticed a unique broken stone mould made of black schist measuring 7-35 x 8-70 x 1-50 m (pis. LII B-C). The mould has three distinct figures. The top figure with elongated earlobes having *akshamala* in his right hand sitting on lotus, wearing *dhoti, yajnopavita,* armlets and necklace. The remaining two figures, placed below the figure mentioned above are badly mutilated, one of which is shown in the posture of offering some object to the other. Below this group of figures are 5 or 6 letters in nail-headed Brahmi script of the fifth-sixth century AD. Only the last two letters could be read as *tapa.*

KARNATAKA

25. TEMPLE SITE, AIHOLE, DISTRICT BIJAPUR.—P.S. Sriraman and M.V. Visweswara of the Ban galore Circle of the Survey brought to light two temple sites during their exploration around Aihole. One of the sites, located to the east of Galaganatha group of temples was noticed after the clearance of the debris. The plan of the temple consisted of rectangular *garbha-griha* with *mandapa* and *mukha-mandapa* axially oriented east-west. Four images were also recovered. At the other site a 2 m high image of a seated Bhairava made of sandstone was recovered. The image has been kept in the Aihole Museum.

26. BRICK STRUCTURES AND SCULPTURES, HAIGUNDA, DISTRICT UTTARA KANNADA.—K.P. Poonaeha, assisted by S.V. Venkateshaiah, S.S. Nayak, Visweswara and M.M. Hadpad of the Ban galore Circle of the Survey discovered remains of brick structures, sculptures of Buddha, Surya, Yaksha and Vishnu during their exploration in the island of Haigunda. The architectural and sculptural remains are assignable to sixth-seventh century AD.

MADHYA PRADESH

27. SIVA TEMPLE, GUMAD RAL, DISTRICT BASTAR.—G.K. Chandrol, V.P. Nagaich and N.K. Pathak of the Department of Archaeology and Museums, Government of Madhya Pradesh, discovered a Siva temple of the Kakatiya rulers datable to fifteenth century.

28. TEMPLE PLAN, CHHOTA DONGER, DISTRICT BASTAR.—The Department of Archaeology and Museums reported the exposure of a plan of a temple, belonging to the medieval period, during the clearance work of the site.

29. ANTIQUITIES, KAMLA PARK (BHOPAL), DISTRICT BHOPAL.—The Department of Archaeology and Museums, Government of Madhya Pradesh discovered objects, such as a Siva *jalahari* in stone and terracotta human bust, beads, toy objects and Medieval pottery.

30. BRAHMANICAL SCULPTURES, BUDHI MANDU, DISTRICT DHAR.—The Department of Archae ology and Museums, Government of Madhya Pradesh discovered three hundred fifty sculptures belonging to Pratihara and Paramara periods during the clearance of the temple complex.

31. GROUP OF TEMPLE REMAINS, BADKESHWARA, DISTRICT EAST NIMAR.—Narayan Vyas and Phanikanta Mishra of the Bhopal Circle of the Survey noticed a group of small temple shrines near Badkeshwara on the bank of Narmada.

32. OLD HIGHWAY, BARGAON, DISTRICT EAST NIMAR.—H. Michael of the Bhopal Circle of the Survey noticed old highway near Bargaon and Asirgarh. This highway probably belongs to the sixteenth-seventeenth century AD. -

33. SIVA IMAGE, HOSHANGABAD, DISTRICT HOSHANGABAD.—B.L. Nagarch of the Temple Survey Project of the Survey discovered an image of four-armed Siva seated on bull in *lalitasana.* The figure is shown wearing *sarpakundalas* and *sarpavalayas* and having head dress of hooded snake. s

34. CEMETERY, NEEMUCH, DISTRICT MANDSAUR.—Narayan Vyas of the Bhopal Circle of the Survey noticed a cemetery of the British period near Neemuch Cantonment area.

35. SCULPTURES, LOTKHEDI, DISTRICT MANDSAUR.—B.L. Nagarch of the Temple Survey Project of the Survey noticed the stone sculptures of Mahishamardini, Narasimha, Agni, Hanumana and Ganesa datable to the eighth-ninth century AD, kept on the platform of the Sitala Mata temple. He also noticed the remains of a Vishnu temple, datable to ninth century, in the Pratihara style, situated to the east of the Sitala Mata temple platform.

36. TEMPLE AND SCULPTURES, BHEJRATALA, DISTRICT RAJNANDGAON.—V.P. Nagaich of the Department of Archaeology and Museums, Government of Madhya Pradesh, and S.R. Sharma of Khairagarh University discovered ruined Siva temple and sculptures of Bhairava, Nagadeva, Hanumana and Ganesa assignable to twelfth-thirteenth century AD at Bhejratala.

37. RUINED TEMPLE, BHANPUR, DISTRICT RAIPUR.—N.K. Pathak and V.P. Nagaich of the Depart ment of Archaeology and Museums, Madhya Pradesh discovered a ruined temple, belonging to the Somavamsi period and a damaged mud fort datable to seventh-eighth century.

38. SHELL INSCRIPTIONS, MANDUR, DISTRICT RAISEN.—C. Krishna of the Department of Archae ology and Museums, Government of Madhya Pradesh, discovered a red sandstone slab bearing shell inscriptions which speak about Abhira king Iswar Sena. The script is assignable to the early Christian era. The stone slab is new kept in the Bhopal Museum for safety.

39. BRAHMANICAL TEMPLES AND SCULPTURES, DEEPADI, DISTRICT SARGUJA.—Department of Archaeology and Museums, Government of Madhya Pradesh noticed the plans of medieval temples and a sculpture of Pasupata sect at the Deepadi temple complex.

40. SIVA TEMPLE, KHOTI, DISTRICT SATNA.—The plan of the Siva temple, having stone plinth and brick superstructure was noticed by the Department of Archaeology and Museums during the clearance of the debris around the temple at Khoti.

41. SCULPTURES, ANTRA, DISTRICT SHAHDOL.—The Department of Archaeology and Museums, Government of Madhya Pradesh, while clearing the temple complex collected certain sculptures belonging to Sakta cult. .

42. TEMPLE AND SCULPTURES, DEORAS, DISTRICT SIDHI.—The Department of Archaeology and Museums, Government of Madhya Pradesh, discovered a brick temple and sculptures at Deoras.

MAHARASHTRA

43. DEVANAGARI INSCRIPTION, KOLEGAON, DISTRICT BEED.—S.L. Jadhav of the Aurangabad Circle of the Survey discovered a Devanagri inscription engraved on the pillar of the Siva temple datable to the eighteenth century AD.

MANIPUR

44. Historical site and antiquities, Konjeng Poila Leikai, District Imphal.—O.K. Singh of the Department of Archaeology, Government of Manipur, noticed part of a brick structure and collected number of hand made reddish grey stamped pot sherds including legs of a terracotta tripod and a single circular bell-metal coin with the legend *shree,* assignable to eighteenth century.

PUNJAB

45. SEALINGS AND COINS, SANGHOL, DISTRICT LUDHIANA.—Chandigarh Circle of the Survey discovered five sealings and one copper coin at the stupa site during conservation work.

RAJASTHAN

46. BRAHMI INSCRIPTIONS, DISTRICT CHITTAUR.—B.M.S. Parmar of the Directorate of Archaeology and Museums, Rajasthan reported a Brahmi inscription in a step well at Awbleshar in the district.

47. MEDIEVAL SCULPTURES, DISTRICT JALORE.—B.M.S. Parmar of the Directorate of Archaeology and Museums, Rajasthan, reported about ten dozen sculptures, datable between the sixth and fifteenth century, from villages Bhimal, Bibalsar, Harshwara-Sewara, Mataron-Ki-Pal and Ramsen of the district. These sculptures belong mainly to the Brahmanical pantheon. Among the important

sculptures mention may be made of Ganesa, in different postures, Lajjagauri, Kaumari, Varaha, Chamunda, Mahishasuramardini, Siva-Parvati, Kubera, Varaha-Vishnu, Ekamukha-/mga, etc.

The domed ceiling of the Mahavira temple at Ratanpur has the painted depiction of various scenes like carriages, chariots and palanquins. Numerous scenes from the life of Tirthankara are also depicted there.

48. VISHNU IMAGE, KRISHNAVILAS, DISTRICT KOTA.—C.L. Suri and P.K. Trivedi of the Jaipur Circle of the Survey recovered a Vishnu image bearing an inscription dated V.S. 1178 (AD 1121) in Devanagari characters on its pedestal from the ruins of Charkhambha temple. The image was installed in the sanctum as the main deity of the temple suggesting the temple to be of Vaishnava origin.

49. LATE MEDIEVAL TEMPLE, DHIKALI, DISTRICT UDAIPUR.—Vijay Shankar Srivastava of the Directorate of Archaeology and Museums, Rajasthan noticed a fifteenth century Vishnu temple at Dhikali, approximately 12 kms from Ahar. A five line inscription on the Garuda *mandapa,* in front of the main temple, gives the date of the temple as V.S. 1539 (AD 1482). The images of Brahma, Vishnu, Mahesha and Surya are carved in the *Pravesha-mandapa* of the main temple.

50. MEDIEVAL TEMPLE, SEVANA, DISTRICT TONK.—B.M.S. Parmar of the Directorate of Archaeology and Museums, Rajasthan, reported the presence of a circular temple datable to twelfth century.

TAMIL NADU

51. INSCRIPTION, MANGALA THERRTHAM, DISTRICT CHINGLEPATTU.—The Department of Archaeology and Museums, Government of Tamil Nadu discovered inscriptions of the Pallavas on the steps of Mangala Therrtham in front of the Kanchi Sankar Mutt. This inscription is assignable to AD 700-725.

52. PALLAVA SCULPTURE, PONNUR, DISTRICT NORTH ARCOT.—The Department of Archaeology, Government of Tamil Nadu, reported the discovery of a rare Pallava sculpture from village Ponnur, situated 8 km south-west of Vandavasi.

This sculpture, datable to the seventh century AD, has the combined iconographical features of Brahma, Vishnu and Siva. The *kirita mukuta* and the attire of the figure upto ankle resemble that of Vishnu, the *akshamala* held by the upper right hand of the figure suggests it to be Brahma and the axe placed in the upper left hand of the image makes it resemble to Siva. Two Budha Ganas are shown depicted in sitting posture at the foot of the sculpture as if emerging from lotuses. This sculpture may be identified either as a Trimurti or Dattatreya.

53. STONE TUB, THIRUVALLAM, DISTRICT NORTH ARCOT.—The Department of Archaeology, Government of Tamil Nadu, reported the discovery of a circular stone tub of the eleventh-twelfth century of the Chola period at Thiruvallam near Ranipet. This tub might have been used to store for bathing the temple deity.

54. HERO-STONE, CHINNA SALEM, DISTRICT SALEM.—S. Selvaraj of the Department of Archaeology, Government of Tamil Nadu, discovered a hero-stone, datable to fourteenth century, in the Draupadi Amman temple in Chinna Salem, Kallakurichi Taluk.

This hero-stone depicts a man with sword hanging at his waist, standing on an elephant and holding a goad in one hand and lion on the other. Above the figure of the hero a small bowl is placed. This type of hero-stone has not been reported from Tamil Nadu so far.

55. TAME. GRANTHA INSCRIPTION, THANJAVUR, DISTRICT THANJAVUR.— The Department of Archaeology and Museums, Government of Tamil Nadu discovered a fragmentary Grantha inscription on the walls of the *mahamandapa* of the Brihadisvara temple. The inscription is assignable to Nandivarman Pallava.

UTTAR PRADESH

56. MEDIEVAL ANTIQUITIES, FATEHPUR SIKRI, DISTRICT AGRA.—C.P. Singh of the Agra Circle of the Survey discovered an extensive kiln having full of ash, a shallow dish and lamps in the vicinity of Hawa Mahal at Fatehpur Sikri.

57. SCULPTURES, FATEHPUR SIKRI, DISTRICT AGRA.—C.P. Singh of the Agra Circle of the Survey noticed a number of stone sculptures of the Brahmanical pantheon near the gate of old Sikarwar fort. These sculptures are assignable to medieval period.

58. ANCIENT SITE, SONOTI, DISTRICT AGRA.—C.P. Singh of the Agra Circle of the Survey located an ancient site containing Painted Grey Ware and medieval red ware.

59. SCULPTURES, JOSHIMATH, DISTRICT CHAMOLI.—B.L. Nagarch of the Temple Survey Project of the Survey discovered sculptures of dancing Ganesa, in the sanctum of Ganesa temple, and Uma-parinaya, in the sanctum of Gaurishankar temple. Both these temples, located in the compound of Vasudeva temple and the sculptures are the work of the Pratihara style datable to the ninth century AD.

WEST BENGAL

60. BRASS IMAGE, CALCUTTA, DISTRICT CALCUTTA.—The Calcutta Circle of the Survey has reported the examining and taking over of the image of Radhika, from the office of the collector of the customs.

61. STONE IMAGE, HILI, DISTRICT WEST DINAJPUR.—The Calcutta Circle of the Survey examined one stone image of Vishnu at the office of the Customs authority.

62. COPPER OBJECTS, KESKIARY, DISTRICT MIDNAPORE.—The Calcutta Circle of the Survey examined the copper objects which included six celts and a representation of a bull.

V. RADIOCARBON DATES[1]

Radiocarbon dates[2] presented here were determined between April, 1988 and March 1989, at the Physical Research Laboratory, Ahmedabad. All dates are based on 5730±40 years half-life value of radiocarbon and are uncorrected for $^{14}C/^{12}C$ variation. For conversion into BC/AD scale, 1950 is the base year. The sites are arranged statewise and alphabetically.

ASSAM

1. KACHUANI, DISTRICT DIBRUGARH

PRL-1233: Neolithic Culture — 2210±140
Brownish Soil, depth 2-5 m. trial trench,
Sener's sample No. 1

GUJARAT

2. OFF SAURASHTRA COAST, ARABIAN SEA

i. PRL-1310. Quaternary — 8340±140
Sediment Cores from 0-5 cm depth,
Site Station No. 3944.

ii. PRL-1320. Quaternary — 10340^{+250}_{-240}
Sediment cores from 150 cm depth
Site Station No. 3958.

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[1] Contributed by Sheela Kusumgar and M.G. Yadava, Physical Research Laboratory, Ahmedabad.

[2] Further details can be obtained from excavations.

[3] Samples submitted by : 1, Department of Anthropology, Dibrugarh University, Assam; 2, N.I.O., Panjim, Goa; 3, Department of Archaeology, Tamil University, Thanjavur, 4, Department of Ancient Indian History, Banaras Hindu University, Varanasi; 5, Physical Research Laboratory, Ahmedabad; 6, Department of Archaeology, Calcutta University; 7, Directorate of Archaeology, Calcutta, West Bengal; 8, R.S.I.C., North-Eastern Hill University, Shillong; 9, Depart ment of Archaeology, University of Ibdan, Nigeria.

TAMIL NADU

KODUMANAL, DISTRICT PERIYAR

PRL-1182, Megalithic Culture Charcoal from Trench MEG—2 Cist A, Layer 2, depth 1-8 m. Sender's sample No. TML-3	1550±190

UTTAR PRADESH

NARHAN, DISTRICT GORAKHPUR

PRL-1252. Black and Red Ware Charcoal from Trench R 13, Layer 4, depth 1-25 m. Sender's sample No. 1.	930±100

NAUKUCHIYA TAL, DISTRICT NAINITAL

i. PRL-1621. Lake Sediment organic mud from Lacustrine core N-l, depth 0-01 m. Sender's sample No. 1 (43, 44, 45).	630±220
ii. PRL-1620. Lake Sediment Organic mud from Lacustrine Core N-l, depth 1-15-1-25 m. Sender's sample No. N-l (20, 21, 22).	Modern
iii. PRL-1619. Lake Sediment Organic mud from Lacustrine Core N-l, depth 2-15-2-25 m. Sender's sample No. N-l (1, 2, 3).	2810±220
iv. PRL-1624. Lake Sediment Organic mud from Lacustrine Core N-2, depth 0-01 m. Sender's sample No. N-2 (58, 59, 60).	1440±260
v. PRL-1623. Lake Sediment Organic mud from Lacustrine Core N-2, depth 1.45-1.55 m. Sender's Sample No. N-2 (29, 30, 31)	3470±270

vi. PRL-1622. Lake Sediment Organic mud from Lacustrine Core, N-2, depth 2-90-30 m. Sender's sample No. N-2 (1, 2, 3). — 3100±170

WEST BENGAL

6. MANGALKOT, DISTRICT BURDWAN

PRL-1358.
Charcoal, Sender's sample — 2870^{+115}_{-110}

No. MGKT-2/89.

7. PANDU RAJAR DHIBI, DISTRICT BURDWAN

i. PRL-1185. Period II
Charcoal from Trench A,
Layer 8, depth 1-89 m.
Sender's sample No. III. — 2950±140

ii. PRL-1184. Period I
Charcoal from Trench A,
Layer, 9, depth 2-7 m.
Sender's sample No. II. — 3130±110

iii. PRL-1183. Period I
Charcoal from Trench B,
Layer 12, depth 3-18 m.
Senders sample No. 1. — 2880±110

SAMPLES FROM ABROAD

IRELAND

8. OFF SEA COAST, WEST IRELAND

PRL-1255 — 4620±110
Wood from swampy land
depth 2.0 m.

NIGERIA

9. HOUSE 1 (KA 452), DISTRICT USHONGO — 1130±150

i. PRL-1292. Historical levels
Charcoal from Trench House 1,
Layer 2, depth 015 m. Sender's
sample No. 1.

ii. PRL-1293. Historical levels — 310+150
Charcoal from Trench House 1,
Layer 7, depth 0.62 m. Sender's
sample No. 2.

iii. PRL-1294. Historical levels — 580±130
Charcoal from Trench Test-pit 1,
Layer 1, depth 0-1 m, Sender's
sample No. 3.

iv. PRL-1295. Historical Levels — Modern
Charcoal from Trench Test-Pit-1,
Layer 6, depth 0-54 m. Sender's
sample No. 4.

VI. MUSEUMS

1. ARCHAEOLOGICAL MUSEUM, AIHOLE.—The museum acquired one hundred ninety-six antiqui ties from debris nearby. Arrangements were made for spot lighting as a security measure.

2. ALLAHABAD MUSEUM, ALLAHABAD.—The museum acquired one hundred and thirty-two Buddhist *thankas* datable between the thirteenth and eighteenth.century AD collected by Prof. Raghuvira from the region of China, Mongolia, U.S.S.R. and Tibet; one copper celt and ten silver Sultanate coins both received from the local police; two Persian manuscripts, *Diwan-i-Hafiz* and *Rubaiyat-i-Umar Khaiyam,* both written on hand-made paper by Haji Ibrahim in Haram Kaba in AH 1070 and a cylindrical pocket-watch.

The museum arranged a number of special exhibitions on *'Tolstoy: His life and Work', 'Modern Indian Paintings', 'Nehru Personalia',* and *'The life and works of Jawaharlal Nehru'* besides re-organizing different galleries. The museum also organized a summer course for school children on *'Indian and European Art'.*

3. ARCHAEOLOGICAL MUSEUM, AMARAVATI.—The image of a bull, recovered in fragments from the Amaresvara Temple, was mended and displayed in the Gallery III (pl. LIII A). The specimens acquired during the period comprise an inscribed granite pillar, datable to twelfth century AD, from the village Munugonda in the Revenue Mandala of Amaravati, and a fragmentary limestone sculpture of Mahishamardini, datable to the fifth century AD, from Dharanikota.

4. PRINCE OF WALES MUSEUM, BOMBAY.—The museum acquired seventy-three art objects which include copper celts (17.7 X 7 cm) and harpoon (33.5 X 5.7 cm), datable to the first millennium BC, sculptures, paintings, clothes, twenty-six tracings of mural paintings from the Tsaparang monastery; coinage of Jaswant Rao (silver Nazrana rupee) and compass rose (star chart).

A series of lectures were delivered on the *'Chola Art' ,'The Indus Civilization: History of a Discovery'* and *'The Art of Indus Civilization'.*

Exhibitions were held on the theme of *'The Maritime Heritage of India'* in co-operation with the Indian Navy which displays maritime activity of India from the Harappa culture onwards. Another exhibition was on the *'Design and Everyday objects'* in co-operation with Alliance franciase de Bombay. The museum also sent art objects to Japan for the Festival of India on the theme *'Mriga: Animal in Indian Art',* are datable from the Indus Valley period to the present time. Before sending the objects to Japan, these were displayed in the Coomaraswamy hall of the Museum under the above-mentioned title. A photographic exhibition on the *'Indus Valley Civilization: Forgotten Cities of the Indus'* was organized from the October 1988 in collaboration with Max Muller Bhavan.

'The Summer Art Class 1988' was held at the Orphanage at Matunga on the subject of 'Still Life Paintings' between 10 and 19 May 1988.

Scholars and dignitaries from the USSR, Canada, Bhutan, France, U.K., the Federal Republic of Germany and Italy visited the museum.

Two hundred and eighty-three new books and ninety-one periodicals were added to the Research Library. The museum also brought out a publication entitled *Mriga:Animal in Indian Art* (ed) Sadashiv Gorakshkar, a catalogue of the Festival of India Exhibition held in Japan.

5. ARCHAEOLOGICAL MUSEUM, BIJAPUR.—The museum organized photo-exhibition, film shows and other cultural activities for the World Heritage Week (November 19-25,1988). On this occasion, a multi-coloured brochure was also brought out.

6. ARCHAEOLOGICAL MUSEUM, BODHGAYA.—Lighting arrangements, re-painting and colour washing of the museum galleries were completed.

7. INDIAN MUSEUM, CALCUTTA.—The museum acquired through purchase and gift two stone and six copper implements belonging to the prehistoric period; seven stone sculptures, sixteen terracotta objects; three bronze images and one hundred and fifty-six coins of gold, silver and copper belonging to the Kushana, Gupta, Mughal rulers and the Sultans of Bengal, Assam and Tripura. Noteworthy among the coin-collections are the Apratigha type of a Kumaragupta a silver Kamran Mirhabi coin of Akbar, one double *muhr* of Jahangir and a copper coin of Sikandar Shah of Bengal.

The Gandhara Gallery and the Sarnath Bay of the Long Gallery were renovated and opened to public. The renovation work of the Bhumara Bay is in progress.

Study facilities were made available to the students of the Government College of Arts and the different scholars from India and Australia, U.S.S.R., U.K. etc.

8. ARCHAEOLOGICAL MUSEUM, CHANDRAGIRI.—The museum acquired forty-two sculptures belonging to the late Vijayanagara period from Yaganti, District Kurnool (pls. LIII B-C). A replica of the *linga* of Gudimallam (second century BC) was installed in the Central Hall near the entrance. The bronzes from Gudimallam was displayed. Vinatile flooring was spread in the Central Hall.

The museum, which was inaugurated on November 19th 1988, organized photo-exhibition and other activities were organized during the World Heritage Week (November 19-25, 1988).

9. MATTANCHERRY PALACE MUSEUM, COCHIN.—The museum acquired one Jaina sculpture 61 x 22 x 16 cm carved on granite, an ornate brass vase (26 cm) (pl. LIV A) and two palm leaves written in Malayalam script of the eighteenth century.

10. ARCHAEOLOGICAL MUSEUM, RED FORT, DELHI.—The Bahadur Shah Zafar Gallery was re organized and opened for the public (pl. LIV B).

11. ARCHAEOLOGICAL MUSEUM, GWALIOR.—Organization of the main hall adjoining rooms and western verandah was completed (pl. LV).

12. ARCHAEOLOGICAL MUSEUM, HALEBID.—Barbed wire fencing was provided to the reserve collection as a security measure. Face-lifting of the gallery and open-air museum was completed.

13. ARCHAEOLOGICAL MUSEUM, HAMPI.—The museum required three composite granite pillars of the Vijayanagar period from Talarigatta (pl. LVI A) and three gymnasium weight-lifting (pi. LVI B) round stones from Anegondi near Hampi. Gallery nos. 3 and 4 were re-organized with suitable showcases and pedestals. The lighting arrangements of the showcases displaying coins and pottery and the model highlighting Hampi Valley were made better. The painting work in the gallery no. 2 was completed. The museum also observed the World Heritage Week from 19 to 25 November 1988.

14. STATE MUSEUM, HYDERABAD.—The museum acquired punch-marked silver coins and coins of the Western Chalukyas, Kakatiyas, Vijayanagar, Bahmanis, Qutb Shahis, Asaf Jahis, Mughals and the British as Treasure Trove from different parts of Andhra Pradesh.

15. PANDIT JAWAHAR LAL NEHRU SCIENCE AND CULTURE CENTRE, LAL BAGH, INDORE.—To commemorate the birth centenary of Pandit Jawahar Lal Nehru, a Science and Culture Centre was established at Lalbagh palace, Indore. Antiquities of the erstwhile princely state were displayed for the public. Collection of rare cassettes on Indian Classical Music was acquired for the music library.

16. RAJWADA PERIODICAL MUSEUM, INDORE.—The front portion of the Rajwada palace at Indore was converted into a period museum.

17. GOVERNMENT MUSEUM, JHANSI.—The museum acquired an image of Ravananugrahamurti datable to the tenth century from Lalitpur. Three handaxes and a scraper on sandstone were also acquired from Bayana Nala in Janapada Lalitpur.

18. ARCHAEOLOGICAL MUSEUM, KALIBANGAN.—Two inscribed terracotta Harappan sealing (one measuring 3.6 X 1.2 X 0.5 cm and the other partly broken) were acquired (pl. LVII A).

19. ARCHAEOLOGICAL MUSEUM, KHAJURAHO.—The museum acquired 76 antiquities (pl. LVII B) and organized a photo-exhibition and other cultural activities during the World Heritage Week.

20. ARCHAEOLOGICAL MUSEUM, KONARAK.—Old pedestals were re-veneered and four new pedestals were provided for display of objects. Re-painting of the museum galleries was completed. The museum also observed the World Heritage Week (November 19-25, 1988) with photo-exhibi tion, film show and other cultural activities.

21. ARCHAEOLOGICAL MUSEUM, LOTHAL.—The museum received rectangular terracotta Harap pan seal for its collection (pl. LVIII A). The objects exhibited in the galleries were provided with individual and descriptive labels. The exterior lighting arrangements were also improved.

22. STATE MUSEUM, LUCKNOW.—The museum acquired one hundred and eighteen objects which include stone and terracotta sculptures, coins, clay seals, textiles, paintings and decorative art wares. Important among them are a Siva head (10 cm in height), two human heads (Kushana period, 8.5 and 12.5 cm height), amorous couple (second century BC; 10 X 6.6 cm) and a pillar capital (third century AD; 26 X 26 cm).

23. FORT ST. GEORGE MUSEUM, MADRAS.—The painting and colour washing of the entrance and lobby portions of the museums has been completed. The termite infested plywood sheets in gallery was replaced with the kitply.

24. GOVERNMENT MUSEUM, MADRAS.—The museum acquired 129 objects through different sources viz., treasure trove (84 nos.), confiscation (13 nos.) and purchase (32 nos.). Important among them are the image of crawling Krishna, Venugopal, Sri Devi, Bhudevi, Lakshmi Durga, Kali, Vishnu, conch-shaped stand, a bell handle with the figure of Hanuman on top, lamps and, twenty-five Telugu palm-leaf manuscripts.

Minor changes were made in the new Extension Gallery and Jaina Gallery by changing the bilingual labels of the exhibits.

25. GOVERNMENT MUSEUM, MATHURA.—The museum accessioned six hundred eighty-nine objects out of which mention may be made of a fragmentary stone inscription in Brahmi characters of the first century BC (pl. LVIII B) which records excavation of a tank *(pushkarini)* by a Brahmana named Virbala in the year 116 of the Yavanarajasya (?). Another interesting object, an inscribed *ekamukha Siva-linga* (pl. LVIII C) of first century AD, showing *ekavali* and *jata* falling on both the shoulders and having four devotees standing on the lower part of the *linga;* and an inscribed stone pedestal dated to Saka year 79, corresponding to AD 157-58 having a scene representing the worship of wheel *(dharmachakra)* by two monks.

The museum also organized an exhibition on 'Mother goddess in Mathura Art'.

26. HAZARDUARI PALACE MUSEUM, MURSHIDABAD.—The work of painting and colour washing in the library, manuscript room, hall of royal exhibits, portrait gallery of the Nawab family and the gallery of the Dewans and Nazirs, was completed.

The portrait gallery of the Nawab family and the gallery of the Dewans and Nazirs were reorganized. A photo-exhibition, showing important monuments of the country with emphasis on the monuments of Bengal, was organized on the occasion of the World Heritage Week (November 19-25, 1988).

27. ARCHAEOLOGICAL MUSEUM, NALANDA.—The Gallery nos. 2 and 3 were reorganized and made open for the public. Stucco heads and the bronze image of Buddha were re-displayed in the Gallery nos. 1 and 2. The museum also organized photo-exhibition, lectures and film-show during the World Heritage Week (November 19-25, 1988).

28. NATIONAL MUSEUM, NEW DELHI.—The museum acquired 1306 objects through Art Purchase Committee. Interesting among them are the wooden Tibetan scale with ivory stick and triangular-shaped scale; seated Suparsvanatha in bronze, dated to AD 1470, from western India and Kushana stone sculpture of seated Kubera and Hariti, second century AD; single barrelled muzzle loading matchlock damascened gun of seventeenth century, and inscribed damascened metallic shield, eighteenth century, both from Rajasthan; silver chair studded with precious and semi-precious gems and a silver footstool; gold necklace of Srinathji studded with gems and gold *sarpech* in fine *kundan* setting studded with precious stones; and illustrated folio of the Holy Quran; silver coin of Gupta king and a copper seal of Aurangzeb Alamgir, eighteenth century AD; a set of forty-four *ragamala* paintings on different *ragas,* early nineteenth century AD.

Besides these, seven terracottas, donated by Dr. Grace Morley and a wooden flask, depicting geometric design, gifted to the Museum by the Union of Siberia, USSR, also came in the possession of the Museum.

29. ARCHAEOLOGICAL MUSEUM, SANCHI.—The main hall of the museum was reorganized and opened to the public.

30. ARCHAEOLOGICAL MUSEUM, SARNATH.—Re-painting of the museum galleries and anti-termite treatment in the reserve collection room was completed. A showcase was provided to display the 'Standing Tara' Sculpture in gallery no. 4. The museum also observed the World Heritage Week (November 19-25, 1988) with photo-exhibition and other cultural activities.

31. TIPU SULTAN MUSEUM, SRIRANGAPATNA.—The antiquities displayed on the first floor were shifted to the ground floor and displayed there with proper lighting arrangements.

VII. ARCHITECTURAL SURVEY

TEMPLE SURVEY (NORTHERN REGION).—The Temple Survey Project (Northern Region) under B.L. Nagarch continued the work of architectural survey of the temples of the Paramaras. The Siva temple at Kachnariya, ruins of temples at Pipalrawan, the Siva temple known as Karnesvara Mahadeva temple at Karnavad, all located in Dewas, the ruins of temples at Budhi Mandu in district Dhar, and other temples of the period situated in the Districts of Khandwa, Mandasaur, Raisen and Ujjain were surveyed.

The Siva temple at Kachnariya is now in ruins. Among the ruins could be noticed images of dancing Siva, Uma-Mahesvara, Lakulisa and Nandi. Besides, fragments of *adhishthana* mouldings, *jangha, sikharas* and ceiling slabs were also lying at the site. From the architectural and sculptural style of the ruins it is evident that the temple was contemporary with the Mamalesvara Mahadeva temple at Onkar Mandhata in district Khandwa.

Among the ruins of temples recovered from Pipalrawan is an image of Brahma-Brahmani now fixed in the police station. This image, assignable to eleventh century AD, is a good specimen of the Paramara period. Some of the architectural pieces of a Paramara temple have been used in the construction of the Lakshmikanta temple assignable to seventeenth century, while others are fixed on the platform of a modern Hanuman temple.

The Karnesvara Mahadeva temple at Karnavad was built in AD 1218 during the reign of the Paramara king Devapaladeva. The completely collapsed original temple had been rebuilt in the recent past. The architectural members of the original temple, now stacked at the site, include pillars, pilasters, ceiling slabs and miniature models of the *bhumija sikhara.* Among the sculptural remains could be noticed images of Vishnu, Andhakasuravadhamurti of Siva, dancing Chamunda, Mahisha-mardini, dancing Ganesa, Nataraja, Kubera, Uma-Mahesvara and Brahma.

Among the ruins of the five Paramara temples found at Budhi Mandu mention may be made of fragmentary *pitha* and *adhishthana* mouldings, portions of *jangha, sikharas* and pillars and a number of sculptures including those of Lakshmi Narayana, Uma-Mahesvara, *dikpalas,* Parvati and Durga. Temple No.l, located near the eastern main gateway to Budhi Mandu, has survived only upto the *pitha* portion. Temple No. 2 is located to the west of temple No.l and consists on plan of a *pancharatha* sanctum and an *antarala.* The *antarala* is in ruinous condition. Only the *pitha* and *adhishthana* mouldings of the sanctum and a small portion of the *jangha* on the south-east have survived. This temple was dedicated to Sakti and is assignable to the first half of the thirteenth century AD. It was in the *bhumija* style as evident from its stellate plan and the presence of miniature *sikharas.* The temple No. 3, built over a platform, is located to the west of the step-well. Only the *pitha* mouldings of the temple have survived. The temple consists on plan of a *pancha-ratha* sanctum, an *antarala,* a *sabha-mandapa* with lateral transepts and an *ardha-mandapa.* This was probably the largest and the most magnificent temple at the site. The sculptural evidence indicates dedication of the temple to Vishnu. Temple No. 4 consists on plan of a sanctum, an *antarala,* a *sabha-mandapa* with lateral transepts and an *ardha-mandapa.* This was probably the largest and the most magnificent

temple at the site. The sculptural evidences indicate dedication of the temple to Vishnu. Temple No.4 consists on plan of a sanctum an *antarala, sabha-mandapa* with lateral transepts and an *ardha-mandapa.* The temple stands on a platform and its *ardha-mandapa* is approached by a flight of ten steps on the east. Only the *pitha* mouldings of the temple have survived. The ruins of the upper portion of the temple are lying scattered at the site. Inside the sanctum is a *yoni-patta* showing that the temple was dedicated to Siva. Temple No. 5 consists on plan of a rectangular sanctum, an *antarala,* and an open *ardha-mandapa.* The sanctum has the remains of eight pillars, four pillars each in two rows. The sanctum doorway is decorated with five *sakhas,* showing the figures of Ganga, Yamuna and female attendants standing in *tribhanga* on the lower portion. The *antarala* has a row of four pillars. Only the plinth of the temple has survived.

The Renuka Devi temple at Khalwa in Khandwa district, dedicated to Siva, is also a Paramara construction datable to the eleventh century AD (pl. LIX A). In the northern wall of the square sanctum is fixed a stone lintel decorated with a frieze of diamonds and rosettes. The original *yoni-patta* and Siva *linga* installed in the sanctum have been replaced by the circular *yoni-patta* and *linga* of a later period. The ceiling of the sanctum has collapsed and is missing. The niche in the western wall of the sanctum contains the pedestal of an image of a female deity whose feet alone have survived. The lion placed at the left of the goddess suggests her identity with that of Parvati. The walls of the sanctum and *antarala arc* washed with ochre colour. The floor of the sanctum is approached by a flight of three descending steps on the east Inside the sanctum are kept images of Bhairava, Brahma, Savitri, Lakshmi-Narayana and Nataraja. The sanctum-doorway consists of five elaborately carved *sakhas.* A four-armed seated Ganesa is shown on the *lalata-bimba.* Above the *chhadya* of the sanctum-doorway are shown five niches, containing the images of five *matrikas* i.e. Sarasvati, Chamunda, Vaishnavi, Aindri and Mahesvari. A niche on the southern wall of the *antarala* shows an image of dancing Ganesa. The original ceiling of the *antarala* is missing. The *sabha-mandapa* has three *mukha-mandapas,* one each on either side and one at the front. The *sabha-mandapa* and *mukha-mandapas* have collapsed and the architectural and sculptural components are lying scattered around the site. Noteworthy among these sculptures are those of Karttikeya and Ganesa, seated with their consort. In elevation the temple shows *pitha* and adhishthana, jangha and *varandika* mouldings. From the extant portion and the ruins, the temple appears to be *bhumija* type consisting on plan of a *pancharatha* sanctum, an *antarala* and *sabha-mandapa* with three *mukha-mandapas.* The temple bears striking similarity with the Paramara temple at Un in Khargone district.

Siva temple at Vithalpur, district Mandsaur, is located to the east of the village. The temple, built in brick and stone masonry, stands on a high platform and consists on plan of a sanctum, an *antarala,* and an *ardha-mandapa.* The original temple is assignable to thirteenth century. It was restored during the Maratha period in seventeenth century. The sanctum enshrines a Siva *linga.* The ceiling of the *ardha-mandapa* is plain and rests on two pillars and two pilasters. There is a painting of two circles in red colour executed on the ceiling during the Maratha period. The ceiling of the *antarala* is also painted with a lotus in red colour. There is an obliterated inscription of nine lines written on the pilaster of the northern wall of *antarala,* in Devanagari characters of seventeenth century. The

sanctum doorway consists of four *sakhas.* On the lower portion of the left flank of the sanctum doorway are carved images of Ganga and a Saiva *dvarapala.* In the right flank of the sanctum doorway are shown images of a Saiva *dvarapala,* Yamuna and a female chauri-bearer. On the *lalatabimba* is shown two-armed Ganesa seated in *lalitasana* and carrying *modakapatra.* The sanctum enshrines a Siva *linga* installed on a *yonipatta.* Inside a niche on the northern wall of the sanctum is kept an image of four-armed Parvati. A niche in the western wall of the sanctum contains an image of four-armed Vamana standing in *samapada.* The ceiling of the sanctum rests on four plain pilasters and is carved in the centre with a full blown lotus. It consists of three intersecting squares arranged one above the other in the trabeate style. On the exterior facade there is a niche each in the southern, western and northern walls of the sanctum. The niche in the northern wall of the sanctum contains two images each standing in *tribhanga* in *anjali-mudra.* Both of them seem to be royal personages, who were perhaps connected with the construction of the original temple. The pilasters of the niche are carved with an inscription in the Sanskrit language and Deyanagari characters of thirteenth century. The sanctum supports a circular dome of brick masonry which is crowned by *chandrika, amalaka, kalasa* and *bijapuraka.* The roof of the *ardha-mandapa* is flat.

The Parsvanatha temple at Kethuli, in district Mandsaur, is assignable to twelfth century AD and was built during the reign of the Paramaras of Malwa. It is located inside an enclosure wall with an entrance-doorway on the east. The doorway consists of five *sakhas.* On the lower portion of the doorway are carved figures of Ganga, Yamuna, Saiva *dvarapalikas* and female attendants. The *lalatabimba* depicts six-armed Andhakantaka Siva. On the right end of the lintel is shown four-armed Mahesvari and on the left end of the lintel is depicted four-armed dancing Chamunda. The remaining five Matrikas are also carved on the lintel of the doorway. Behind the doorway is an *ardha-mandapa* resting on two richly carved pillars and two pilasters. The ceiling of the *ardha-mandapa* is decorated in the centre with a full-blown lotus having a pendant. The temple consists on plan of a sanctum, an *antarala, gudha-mandapa, mandapa* and an *ardha-mandapa* which was decorated with a *torana.* The ceiling of the *mandapa* rests on fifteen pillars and pilasters arranged in four rows. The pillars are richly carved with friezes of elephant heads, lotus-scrolls and *kirttimukhas.* The ceiling of the *mandapa* is divided into eight compartments by means of pillars and pilasters. To the south-west corner of the *mandapa* is a *veal,* over which stand three shrines. In the western wall of the *mandapa* is a doorway having three *sakhas,* which has been painted in modern times. On the lower portion of the doorway within a niche, are carved images of Ganga and Yamuna and a Saiva *dvarapala.* The *lalatabimba* shows four-armed Lakulisa seated in *padmasana.* All the evidences are suggestive of this doorway being a part of the Saiva temple. The *gudha* or closed *mandapa* is provided with two doorways, one on the east and three on the north and a window on the south for admitting light and air. The northern and the southern walls of the *gudha-mandapa* have two niche shrines each, now without any deity. The ceiling of the *gudha-mandapa* rests on sixteen pillars and pilasters arranged in four rows. This arrangement divides the ceiling into nine compartments. On each side of the *gudha-mandapa* is a lateral transept. Attached to the western wall of the *gudha-mandapa* are two *vedis* on which are kept marble images of Jaina Tirthankaras. In the southern transept of the *gudha-mandapa*

is kept an image of a Jaina Tirthankara seated in *padmasana* in *dhyanamudra.* Around this image are the seventy-two *jinas,* either in seated or in standing postures (pl. LX A). The ceiling of the *antarala* is flat and plain and rests on two richly carved pilasters. The northern and southern walls of the sanctum have each a niche which are vacant at present. The sanctum-doorway is decorated with four *sakhas.* The *lalatabimba* shows a seated Jina in *padmasana* in *dhyana-mudra.* At either end of the lintel is shown a standing Jina flanked on either side by an attendant. The niche on the right of the doorway has an image of four-armed Siva carrying *kati* and *khatvanga* in his right hands. On the left of the doorway in another niche containing an image of a four-armed male deity standing in *tribhanga.* The walls of the sanctum are plain and the ceiling of the sanctum is supported by four pilasters, one at each of the four corners. The ceiling is decorated with a full-blown lotus. The sanctum enshrines two stone images of Parsvanatha. It seems that this temple was originally a Siva temple and was later on converted into a Jaina temple. The *sikhara* above the sanctum is of *pancharatha* variety and is crowned by *griva, amalaka,* another *amalaka, kalasa* and *bija-puraka.*

The temple of Seshasayi at Kethuli is located in the heart of the village and stands on a high platform; The temple consists on plan of a sanctum, an *antarala,* a *sabha-mandapa* and an *ardha-mandapa.* The ceiling of the *ardha-mandapa* rests on two pillars and two pilasters, decorated with friezes of diamonds and *kirttimukhas.* The ceiling is decorated with a full-blown lotus. The *ardha-mandapa* and *sabha-mandapa* are provided on either side with stone benches. The *nabhichchhanda* variety of ceiling of the *sabha-mandapa* rests on fourteen pillars and two pilasters, and consists of fifteen concentric overlapping circles topped by pendant in the form of a lotus. The sanctum-doorway consists of five plain *sakhas* decorated in the lower portion with the sculptures of Ganga and Yamuna, Saiva *dvarapalas* and female attendants. Lakulisa figures on the *lalatabimba,* seated in *padmasana* and carrying *bija-puraka* and *lakuta,* indicates the Saiva origin of the temple. To the western wall of the sanctum is attached a platform on which is fixed a pedestal showing Anantasayi and Lakshmi. The ceiling of the sanctum is decorated with a full-blown lotus. The temple is *pancharatha* on plan and in elevation. The niche in the northern *bhadra* of the sanctum contains an image of four-armed Vinadhara Siva and four-armed Parvati performing *panchagnitapas.* The temple is assignable to eleventh century AD.

The Panchamukhi Mahadeva temple at Nimthur is located on the western outskirts of the village and consists on plan of a sanctum and an *antarala.* The plain northern and southern walls of the sanctum have a niche each, of which only the southern niche contains the image of Hariharahiran-yagarbha standing in *samapada* and carrying lotus, *kapala, trisula, padma, gada* and *sankha.* The ceiling of the *antarala* has collapsed. The sanctum-doorway consists of six *sakhas* all of which are plain. The lower portion of the *sakhas* are decorated with beautiful images of Ganga, Yamuna, a *Saiva-dvarapala,* Garuda and a male *chauri*-bearer. The *lalatabimba* on the lintel of the sanctum-doorway shows the *alinganamurti* of Siva-Parvati, standing in *tribhanga,* with standing Brahma, Brahmani and Lakshmi-Narayana. The sanctum enshrines a *chaturmukha* Siva *linga* installed on a *gauripatta.* The ceiling of the sanctum rests on four plain pilasters and consists of four intersecting

squares arranged one above the other. The top of the ceiling is decorated with a full-blown lotus. The collapsed original *sikhara* of the sanctum has been replaced by a melon-shaped domical *sikhara* during the Maratha period.

On the north of Nimthur village are the ruins of a Jaina temple. Only the *pitha* and *adhishthana* mouldings of the temple are intact. The ruins scattered around the temple include fragments of *jangha* decorated with a plain median band, pilasters of the niches, fragments of mouldings and the doorway and ceiling of the sanctum. There is another Jaina temple, assignable to the ninth century, on the northern outskirts of the village Nimthur. This temple, originally a Pratihara construction has been completely renovated, retaining only the original sanctum-doorway. It consists of five *sakhas* which are elaborately carved.

Dhawala, in district Raisen, has the ruins of two Paramara temples, known as Dhawalamata temple and Siva temple, both belonging to me eleventh century. Only the plinth portion of the Dhawalamata temple has survived. The sculptural remains kept on the plinth of the temple include the images of Uma-Mahesvara (pl. LX B), bust of Ganesa and seated Nandi. A number of architectural members are lying scattered around the temple. The Siva temple stands on a hillock on the western outskirts of the village. It is in a ruined state and consists on plan of a sanctum, an *antarala* and *sabha-mandapa.* The sanctum is approached by a flight of three descending steps on the eastern side. The walls of the sanctum are plain. The niche on the western wall of the sanctum is lying vacant. The square sanctum enshrines a Siva *linga* on a circular *yoni-patta.* The walls of the sanctum have survived only upto a height of 114 m. The left flank of the sanctum-doorway is still intact and is carved with five plain *sakhas.* On the lower portion of the *sakhas* are shown a river goddess and a Saiva *dvarapala.* The right flank of the sanctum-doorway has collapsed and is lying at the site. The *antarala* and the *sabha-mandapa* have completely collapsed. However, both the pilasters of the *antarala* are in situ. Fragments of *adhishthana* mouldings, niches, shafts, bases and capitals of pillars, architraves of the ceiling, flanks of the doorways, fragments of the *sikhara* and a number of sculptures viz., ten-armed dancing Ganesa, a female attendant, a Nandi, Lakulisa, Nataraja and Ardhanarisvara can be seen among the scattered ruins of the temple.

The Dhanvantari Mahadeva temple at Baijnath, in District Ujjain, consists of a *pancharatha* sanctum, an *antarala* and a *mandapa* (pl. LXI A). At present only the sanctum and *antarala* have survived. The collapsed portion of the temple has been restored in recent times. The interior of the sanctum is plain except for three niches, one each in the southern, northern and western walls. The niche in the western wall is comparatively larger and contains two modern images, one of Siva and the other of Parvati. The niche in the southern wall contains an image of seated Ganesa. The niche in the northern wall contains a modern marble image of Hanumana. There is no Siva *linga* inside the sanctum. The ceiling of the sanctum resembles the ceiling of the Devi temple at Malavai near Alirajpur and shows the method of construction of the *sikhara.*

The Mahadeva temple at Jalawa in Ujjain district consists, on plan, of a *pancharatha* sanctum, an *antarala,* a *sabha-mandapa* and an *ardha-mandapa.* The *ardha-mandapa* has completely collapsed, and the *sabha-mandapa* which too had collapsed has been restored recently. The niche in the

western wall of the temple contains an image of four-armed standing Parvati. The sanctum enshrines a Siva *linga*. The ceiling of the sanctum is of *nabhichchhanda* variety. The sanctum-doorway is modern and is decorated with three *sakhas*. The flat ceiling of the *antarala* is plain and rests on two ornamented pilasters. There are two niches in the walls of *antarala* each containing an image of seated Ganesa. The flat and plain ceiling of the *sabha-mandapa* is supported by four pillars and twelve pilasters arranged in four horizontal and four vertical rows. On a platform, in the south-west corner of the *sabha-mandapa,* is kept an image of four-armed Vishnu standing in *samapada* and carrying *sankha, gada, chakra* and *padma*. On the south-eastern corner of the *sabha-mandapa* is a *balipitha*. The *pitha* and *adhishthana* mouldings of this temple are partly covered with debris on the southern and northern sides. The *Jangha* above the *adhishthana* is missing. In its place a modern wall with three courses has been constructed. The topmost course supports a modern cylindrical *sikhara* crowned by three *kalasas*. Of the sculptural remains kept around the temple mention may be made of the images of seated Uma-Mahesvara and Nandi, dancing Chamunda, Dikpalas, Agni, Nairitta, Kubera and a Siva *linga*. The temple was probably built in the *bhumija* style, of the Paramaras of Malwa, can be dated in the eleventh century AD.

The Siddhesvara Mahadeva temple located on the northern outskirts of the village Jalawa consists on plan of a sanctum and a modern *sabha-mandapa*. The sanctum enshrines a Siva *linga*. The collapsed original temple has been reconstructed using some of the old architectural members, indicated by their presence in the walls of the sanctum. These members include *chaitya*-dormer of the *sukanasika,* slabs of the ceiling decorated with full-blown lotuses and fragments of *sikhara*. The sanctum doorway is modern. Fragments of the original *sikhara* have been fixed in the walls of the *sabha-mandapa*. The flat and plain ceiling of the *sabha-mandapa* is supported by two pillars and two pilasters. The southern wall of the *sabha-mandapa* bears a large *chaitya*- dormer of the *sukanasika,* profusely decorated on the borders with lotus-scrolls, *padmalata* and mango-strings. Inside the dormer are shown two pilasters. On the right and left flanks of the sanctum-doorway are two modern niches, the one on the right containing an image of seated Ganesa. Among the loose sculptures, kept on the platform in front of the temple, could be noticed those of seated Nandi, a bold *kirttimukha,* three-headed Mahesamurti, standing Parvati and a number of *bhumija sikharas*. It is evident from the available ruins that the original temple belonged to *bhumija* style and is assignable to eleventh century AD.

Panbihar, District Ujjain, has the ruins of four temples belonging to the tenth century AD. A modern Hanumana temple is located on the site of an ancient Paramara temple. At present, a number of sculptures are seen lying near the site among which mention may be made of Uma-Mahesvara, fragmentary images of Vishnu, Mahishamardini, standing Parvati, dancing Chamunda, Garuda in *anjalimudra,* seated Lakulisa, seated Nandi and *yonipattas*. Inside the sanctum is kept an image of seated Yoganarayana. Among the architectural fragments could be noticed ceiling stone slabs decorated with *kirttimukhas*.

Near the modern Lakshmi-Narayana temple at Panbihar there was a Siva temple belonging to the Paramara period. Among the sculptural ruins of the temple could be noticed images of

Kamadhenu, Uma-Mahesvara, Vishnu, three-headed and four-armed Yogesvara Siva, a seated Nandi and a *yoni-patta.* Among the architectural ruins could be seen fragments of *sikhara* carved with *chaitya-arches* and lintel of the sanctum-doorway showing seated Ganesa on the *lalatabimba,* an *amalaka* and *yoni-patta.*

The ruins of a Paramara temple, assignable to the eleventh century and dedicated to Siva, one situated near the Pingalesvara Mahadeva temple at Pingalesvar, near Ujjain. The ruins included images of seated Uma-Mahesvara, Parvati practising penance and seated Yogesvara Siva. The architectural ruins show ceiling stone slab carved with bold *kirttimukha,* fragment of an *amalaka,* base of a pillar carved with *kumbha* and *kalasa* mouldings and fragments of *adhishthana* mouldings carved with *chaitya*-arches.

The ruined Siva temple at Baneda, District Ujjain, consists on plan of a sanctum, an *antarala, maha-mandapa* and an *ardha-mandapa.* The ceiling of the *antarala,* sanctum and the *sikhara* have collapsed. Only the stone foundations of the *maha-mandapa* and *ardha-mandapa* are extant. The sanctum enshrines a Siva *linga* installed on a *yonipatta.* At present tin-sheets have been provided to cover the *antarala* and the sanctum. Among the piled-up architectural fragments can be noticed the base and the capital of a pillar, door-jambs, fragmentary *adhishthana* mouldings and fragments of *jangha.* The sanctum-doorway is decorated with five *sakhas.* The lintel of the sanctum-doorway is missing. The miniature shrine models of the *sikhara,* seen among the ruins of the temple, indicate that in all probability temple was built in the *bhumija* style. This is also supported by the fragmentary *chaitya* medallions of the *sukanasika* recovered from the site. The temple was provided with an entrance-gateway on the south. On a platform to the south of the temple are kept two images, one of ten-armed Chamunda seated in *lalitasana* on a corpse and the other of four-armed Karttikeya seated in *lalitasana.* Both these sculptures are assignable to the eleventh century.

The Nilakanthesvara Mahadeva temple, also known as Phuta Dera at Bichharod, in district Ujjain is a modern temple built on the site of a Paramara Siva temple assignable to eleventh century. Among the stacked fallen members of the original temple can be seen the images of Siva-Parvati seated in *lalitasana* on the mount bull, four-armed dancing Ganesa, four-armed standing Vishnu with *ayudhapurusha,* four-armed Varahi and seated Nandi. The architectural fragments include those of pilasters decorated with half-*chaitya* arches, *adhishthana* mouldings, *amalaka* and plain *bhuta*-brackets. On plan, the modern Siva temple, enshrining a Siva *linga* consists of a sanctum and an *antarala.* Among the components of the old Paramara temple, used in the construction of this temple, mention may be made of *adhishthana* mouldings, pilasters and a *dvarasakha.*

The Siva temple at Chintaman Jawasia, near Ujjain, consists, on plan, of *a pancharatha* sanctum, an *antarala,* a *maha-mandapa* and an *ardha-mandapa.* The superstructures of the sanctum and the *antarala* had collapsed and have been restored recently. The *maha-mandapa* and *ardha-mandapa* had collapsed completely. The walls of the sanctum are plain and support a trabeate plain ceiling! In the western wall of the sanctum is a rectangular niche housing modern images of Gayatri, Durga and Ganesa. In the north-western comer of the sanctum is fixed a modern seated Nandi. In the centre of the sanctum is enshrined a Siva *linga* on a *yoni-patta.* The sanctum-doorway is decorated with five

sakhas which are plain except for the decoration of a *chaitya-arch* on each *sakha.* The walls of the *antarala* are plain and support the architrave of the ceiling decorated with *kirttimukhas.* The flat ceiling of the *antarala* is decorated with a diamond design and is supported by two pilasters. On the floor of the *maha-mandapa* is a *yajna-vedi* constructed in recent times. The original Nandi image which was enshrined in the *maha-mandapa* is also seen nearby. The elevation of the temple shows the *pitha* and *adhishthana* mouldings, *jangha,* and the *varandika* mouldings. The debris of the *sikhara* are lying around the temple. The image of four-armed Brahma, once kept in the southern *bhadra-niche* of *the jangha* is now removed from there and kept nearby. The sculpture in the northern *bhadra of jangha* represents four-armed standing Vishnu. Among the noteworthy sculptures lying on the site are those of standing Vishnu, Brahma, Ganesa, an ascetic, four-armed dancing Chamunda, four-armed Varaha in *alidha* posture, a four-armed male deity seated in *lalitasana,* four-armed Siva seated in *lalitasana,* four-armed Narasimha killing the demon Hiranyakasipu. The architectural ruins of the temple lying at the site comprise a large *chaitya-dormer* of the *sukanasika* of the *bhumija sikhara,* niches and their pediments, bases of pillars and pilasters, fragmentary *pidha* roofs, lintels, fragments of *sikhara,* a number of miniature shrine-models or *sikharikas* of a *bhumija sikhara* and *kalasa.* On the basis of the scattered architectural members and sculptural pieces, this *bhumija* style of temple can be dated to the eleventh century AD,

The Siva temple at Talod, in district Ujjain, shares many traits of architectural and sculptural styles with the Siva temple at Chintaman Jawasia and seems to be contemporary with it. Situated in the heart of the village the temple consists, on plan, of a *pancharatha* sanctum an *antarala,* the *maha-mandapa* and an *ardha-mandapa,* However, the southern and western walls of the sanctum and its *sikhara,* the *antarala,* the *maha-mandapa* and *ardha-mandapa* have completely collapsed and the debris is lying scattered at the site. The sanctum enshrines a Siva *linga* installed on circular *yonipatta* carved on the floor of the sanctum. From the north-west portion of the temple, it appears that the ceiling on the sanctum was supported on brackets and its lower most course was octagonal. Inside the sanctum are kept the sculptures of Sarasvati, Vishnu, Kubera and a male deity. The plain doorsill shows a projecting *mandaraka* at the centre. Of the sculptural and architectural components lying at the site, mention may be made of seated Nandi, four-armed Ganesa, standing in tribhanga, four-armed Vishnu seated in *lalitasana,* a *chaitya*-dormer of the *sukanasa* of the *bhumija sikhara,* base of a pillar and shaft of a pilaster. In elevation the temple shows from bottom upwards, *pitha* and *adhishthana* mouldings and *jangha.* On the northern side, *makara-pranala* was provided for the outlet of *abhisheka* water. The *jangha* is divided into two segments by a median band of *chaitya* arches. The projections of *the jangha* are decorated with pilasters while the recesses shows a *ratnakuta* or a shrine motif as in the Mamalesvara temple at Onkarmandhata. The temple belongs to the *bhumija* style of temples. It is made of white sandstone and is assignable to eleventh century AD.

Inside the fort at Mahidpur in district Ujjain, are located two Siva temples of the Paramara period. There were some more temples inside the fort, the ruins of which have been fixed in the walls of the gateway of the fort. Siva temple No.1 is located on the eastern bank of the Sipra river and consists on plan of a sanctum and a *mandapa.* The sanctum enshrines a Siva *linga.* The sanctum

doorway consists of five *sakhas.* The lower portions of the doorway portray standing river goddesses and Saiva *dvarapalas.* The ceiling of the *mandapa* is flat and is supported by eight pillars and four pilasters. Inside a niche, in the western wall of the *mandapa,* is shown an image of Uma-Mahesvara seated in *lalitasana.* A number of architectural and sculptural members, such as images of seated Nandi and Saiva *dvarapala, kirttimukhas* and pilasters are fixed on and near the steps leading to the temple. Siva temple No. 11 is located to the south of Siva temple No.l and consists on plan, of a sanctum, an *antarala* and a *mandapa.* The sanctum enshrines a Siva *linga.* Besides, there are three other images fixed inside the niches on the walls of the sanctum, out of which the image of Parvati standing in *samapada* and practising penance, in the eastern wall of the sanctum, seems to be original and the remaining two images of Surya and Krishna playing on flute, both made on marble are of recent origin. The sanctum-doorway consists of three *sakhas.* On the lintel of the sanctum-doorway is shown two-armed Surya seated in *padmasana* and holding full-blown lotuses in both of his hands. The walls of the *antarala* are plain and are relieved by two niches lying vacant at present. The ceiling of the *antarala* is plain and flat and is supported by ten pillars and two pilasters arranged in three rows, two vertical and two horizontal. The *mandapa* enshrines a seated Nandi. In elevation the temple shows, from bottom upwards, *adhishthana* mouldings, *jangha, varandika* and *sikhara,* the latter being a modem one built in bricks and cement. On the southern *jangha* are the sculptures of *sura-sundaris* in various postures such as wearing *nupura* standing in *tribhanga* and carrying a lotus-parasol and holding a child. These temples are assignable to the tenth century AD.

The modern Hanuman temple, located on the southern outskirts of the village Kalesar *in* district Ujjain, is built on the site of old Siva temple of Paramara period assignable to the tenth century AD. Among the scattered debris of the Paramara temple can be seen the images of four-armed Parvati standing in *tribhanga* and practising penance, standing Vishnu, a circular *yoni-patta* with Siva *linga,* Ganesa seated in *lalitasana* and fragment of a *chandrasila* carved with lotus-petals and a *sankha.* To the south of the temple, is a rectangular stepped *kunda* which is contemporary with the original Siva temple.

In addition to this, the Paramara sculptures housed in the District Archaeological Museum at Hoshangabad were also studied. Among the noteworthy sculptures in the museum are those of Uma-Mahesvara, Parvati performing penance, Bhairava, Nataraja, dancing Ganesa, Saiva *dvarapala,* dancing *ganas,* dancing Chamunda, Lakshmi-Narayana seated on Garuda and Brahma-Savitri. Among the Jaina sculptures could be noticed the image of Suparsvanatha, other Tirthankaras and Jaina *Chatushtika* carved with a seated Tirthankara image on each of the, four faces.

The Mundesvari temple, built on the top of a hill, close to Ramgarh village in district Rohtas of Bihar was also surveyed and studied (pl. LXI B). The temple faces south and consists, on plan, of an octagonal sanctum and a rectangular pillared *mandapa* of which only the pillar bases have survived. The temple has four doorways, one at each cardinal point. The interior of the temple has four central pillars supporting a flat and plain ceiling. The central *mandapa* enshrines a mutilated Siva *linga* on a rectangular *yoni-patta,* but the main object of worship in the temple is an image of

Mahishamardini which is kept in the closed eastern passage. The temple is assignable to seventh century AD.

During the survey of temples in Uttar Pradesh, the Badrinarayana temple at Badrinath, Mata-murtti temple at Mana, Yogabadri and Vasudeva temples at Pandukeshwar, Narasimha temple and Vasudeva group of temples at Joshimath (pl. LXII)and the Siva temple and Parvati shrine at Gope-shwar, all in district Chamoli, were studied. The Siva temple of the Chandella period inside the fort at Garhwa, district Allahabad (pl. LIX B); and the Kardamesvara Mahadeva temple at Kandwa, district Varanasi, were also visited. The Kardamesvara temple consists, on plan, of a sanctum, an *antarala* and an open *mandapa,* approached by a flight of four steps on the east.

TEMPLE SURVEY (SOUTHERN REGION).—Under the Survey of Chola temples in Karnataka, B. Narasimhaiah of the Temple Survey Project, Madras, identified forty-nine Chola monuments on the basis of inscriptional evidences, in the districts of Bangalore, Kolar, Mandya, Mysore and Tumkur of Karnataka state. Twenty-nine monuments in districts Bangalore and Kolar were visited for pre-liminary documentation. These monuments include Ankakkarisvaram Udaiyar Mahadevar, Dal-sanur, Chandramaulisvarasvami temple (upper temple), Kendatti; Kolaramma temple, Kolar, Pidari-yar temple (Sri Parvati Jalakanthesvarasvami temple), Kolar, Ramalingesvarasvami temple, Kor-nelli; Somesvara temple, Diguvapalli; Somesvara temple, Sugatur; Sri Alagaperumal temple (Parvati temple), Bommanahalli; Sri Amritesvara Svami temple, Malurpatna; Sri Aprameyasvami temple Malur, Sri Chennakesvarasvami temple, Madivala; Sri Dharmesvara temple; Hosahalli; Sri Gan-gadharesvarasvami temple, Madivala; Sri Gaurisvarasvami temple, Suladanahalli; Sri Isvara temple, Binnamangala; Sri Kasivisvesvarasvami temple, Kadugudi; Sri Kailasesvarasvami temple, Malur; Sri Narayanasvami temple, Malurpatna; Sri Patesvarasvami and Bhairavesvarasvami temples, Shi-tibetta; Sri Siddhesvarasvami temple, Aivarakandrapura; Sri Solivaramma temple, Chennarayani palle; Sri Somesvara temple, Bommanhalli; Sri Sundaresvarasvami temple, Nandanavana; Sri Yo-ganandisvarasvami temple, Nandi Hills; Tiru Viramisvaram Udaiyar Mahadevar, Avani; Tiru Vi-ramisvaram Udaiyar Mahadevar, Tamaka; and Venkatesvarasvami temple, Snulkal Malai.

BUILDING SURVEY.—R.D. Trivedi, assisted by Daljit Singh, Sudhir Kumar, J.B. Chand and C.P. Satsangi of the Building Survey Project of the Survey, undertook the architectural survey and documentation work of the building at Kankhal and Hardwar in Uttar Pradesh; Jaisalmer and its neighbouring region and Ranthambhor fort in Rajasthan.

At Kankhal two huge gateways, known as Dharamal-ka-Bagh (Naya Akhara) and Baramal-ka-Bagh, located in Pahari Bazar, are noteworthy for their three-storeyed structures, projecting balconied *chhajjas,* decorated niches and paintings representing various decorative and religious themes (pl. LXIII). Both the gateways are located on the main road facing each other. The theme of the paintings on the inner face of the gateways are mostly religious in nature, viz. Krishna *lila,* Durga, Siva-Parvati, Vishnu, etc. There are also the paintings of some royal personnel and ladies. The work can be assigned to early nineteenth century.

Lai Patthar-ki-Haveli, at Kankhal, a two storeyed gateway, is in a dilapidated condition. It consists of balconied *chhajjas.* The painted surface of this structure shows mythological scenes.

Badri Bavla-ki-Haveli, Chhoti Sabzi Mandi, Hardwar, is a remarkable piece of secular architecture. Situated on the right bank of the Ganga, this edifice is a two storeyed building, the entry to which is through a cusped-arch doorway having five openings and projecting balconied *chhajjas* (pl. LXIV A). The painted panels, on the second and third floors, include decorative as well as religious motifs. There is an open courtyard surrounded by pillared verandahs on all the four sides, at the back of which are rooms. The top portion of the gateway on the inner side, has a number of paintings depicting Krishna *Ma* scenes, Siva-Parvati, Ramayana scene and some secular scenes.

Juna Mahal, Gaj-Vilas-palace, Hawa Pol and other residential houses at Jaisalmer were surveyed. Hawa Pol, the last gate of the fort, is a two-storeyed structure with *chhajjas* and balconied *jharokhas* with perforated latticed carvings. The three-storeyed Gaj-Vilas palace, a later addition to the old palace complex, has a beautiful facade having *chhajjas* and balconies. The upper hall on the north-western side of the palace contains wall-paintings representing foliage and floral patterns, Krishna *Ma* scenes, and the scene having Saivite affiliation. Some of the panels portray the general views of forts and royal retinue. The Mandir palace, presently used as residence by the erstwhile royal family, is an intricately carved double storeyed structure having projecting balconies and *chhajjas* shaded by *chhatris* (pl. LXIV B). The gateway of Garhisar tank is a three-storeyed structure having a central arched opening surmounted by balconied *chhajjas* (pl. LXV A). Other structures and buildings documented in Jaisalmer include Diwan Salim Singh-ki-Haveli, Patua-ki-Haveli, Nathmal-ki-Haveli, Vyas *chhatris,* etc.

Other architectural remains around Jaisalmer were also surveyed which include the *chhatris* at Bada Bagh, 5 km north-west of Jaisalmer, the structural remains, *chhatris* and temples at Amar Sagar, 5 km west of Jaisalmer; and structures within the compound wall at Mool Sagar, 6 km south-east of Jaisalmer. The central structure at Mool Sagar is a two-storeyed edifice, the lower one having a pillared verandah with cusped-arches, while the upper storey has a central projecting balcony. On the eastern side of the compound wall, there is a beautifully carved pillared dome with semi-circular *chhajjas* surmounted by a dancing peacock (pl. LXV B).

The architectural remains documented at Ranthambhor, district Sawai Madhopur, include Satpol gate and northern gateway complexes, *maqbaras* and *dargahs.* The *maqbara,* situated near Ganesa Temple, is a square stone-rubble structure resting on a platform and has projected sloping *chhajjas* supported on stone brackets. The pointed-arched entrance, decorated with lotus design, has three niches on either side, the other openings, at the north and south sides, are filled with carved perforated stone *jalis.*

Buildings and architectural remains surveyed in Delhi include Hathi-Khana or Baradari in village Hashtsal, a stone structure on the Ridge near Delhi University and the remains of a building near Sultan Ghari's tomb. Situated on a high platform in village Hashtsal, the two storeyed structure made of larger *lakhauri* bricks and plastered with lime, is known as Hathi-khana. Originally, the building was approached from the east and west side through staircases covered by sloping roof. It

consists of a central pillared hall, entered through three arched-opening having twelve-sided fluted columns and flanked by small rooms on either side. Perhaps, the structure was used as a hunting resort during the late Mughal times.

To the south of the reservoir on the Ridge, there is a rectangular structure of stone rubble set with mortar having four openings on cardinal points, the main entrance being from the western side with a slightly more projected covered passage. It appears that the edifice was originally used as a *shikargah* (hunting resort) during the Mughal times, which was used later on to serve as a battery during the British times.

About eight kms south-west of Qutb Minar on the Palam road, the area around Sultan Ghari's tomb has extensive structural remains of rubble masonry, showing the remains of old plaster at patches. Within this area, there is a granite stone pillar, square at the bottom and circular at the top, having seven line inscription in Nagari script, the second line of which gives the date as Samvat 1448 (AD 1361).

VIII PRESERVATION OF MONUMENTS

MONUMENTS MAINTAINED BY THE SURVEY

AGRA CIRCLE

Uttar Pradesh

1. AGRA FORT, AGRA, DISTRICT AGRA.—Decayed and dead plaster of the walls of central gallery and side gallery of Shish Mahal was removed and reconditioned by 50 mm thick lime plaster and the same was replastered with 12 mm special lime mortar for the smooth surface, to bring out the original ornamentation in stucco on walls. Loose and decayed plaster on walls of rooms and verandah of Machhi Bhavan was removed and replastered. The floor of the verandah was relaid with flag stones and joints were grouted. Badly weathered stone pillar in north-west corner of the verandah was replaced with new one as per the original carved designs. Decayed wooden rafters of the roof of Samman Burj were removed and replaced with new ones after dismantling the copper sheet carefully to avoid any loss to the lime concereted roof. The roof was replastered with special lime mortar. The fortification wall in between Amar Singh gate and Delhi gate was also attended to. Damaged veneer dab and qued stones were replaced with new ones. Dislodged moulded stones of *kangooras* were reset. The walls of the moat were underpinned and replastered in patches at several points. Weathered veneer stones between the second and third bastions of middle fort wall were replaced with new ones.

2. TAJ GROUP OF MONUMENTS, AGRA, DISTRICT AGRA.—The exfoliated *dasa* stones, inlaid panels of the outer facade of the main gate and south-west corner Burz were suitably reset. Decayed and dead concrete roof of *dalans* at the north-south of eastern gate was removed and relaid as per original. The walls were replastered wherever necessary. Exfoliated dab, qued and facade stones of the western enclosure wall were replaced and reset at places. The open joints were painted and watertightened. Missing inlay pieces of the floor of prayer hall of Fatehpuri mosque were restored with new ones on original pattern. Worn-out and missing carved railings *muttakas* of south-eastern Saheli Burz were restored and repairs to the south-western Saheli Burz taken up. Missing and broken railing and *muttakas* around the tomb and the central tank were replaced with new ones.

The work of re-setting the weathered, sunken and dislodged asterisk stones and diamond shaped marble stones of the south-eastern portion of Chameli floor and putting a floating coat of special lime mortar over the decayed lime floor of the central, south-eastern and southern side rooms at the first floor of main mausoleum was continued.

Replacement of decayed, sunken and missing stones of the eastern pavement of Taj with new ones and grouting of open joint of small *chhatris* attached to the main dome of mausoleum was in progress.

3. EXCAVATED REMAINS, FATEHPUR SIKRI, DISTRICT AGRA.—The structural remains contiguous to Diwan-i-Am, Abdul Fazl and Abul Faizi's houses were rendered watertight.

4. GROUP OF MONUMENTS, FATEHPUR SIKRI, DISTRICT AGRA.—The stairs leading to all the terraces have been provided with iron gate to check the movement of visitors. The approach road from Agra gate to the Diwan-i-Am and to Dak Bungalow was recarpeted with a coat of hot mixed bitumen and stone grit to remove the pot holes. Missing *chhajjas,* brackets and veneering stones of hospital complex were restored and damaged parapet wall was reconstructed. The walls and arch-openings of the underground cells were underpinned and pointed. The joints of the flag stones of the open space in between the Khwabgah (Khas Mahal) and Diwan-i-Am were pointed to check the jungle growth. A stone pillar was set in the *dalan* on the western side of Khwabgah to carry the load over the cracked beam. In Jama Masjid, missing and decayed veneer stones, bar of inlaid panels and the ornamental inlay pieces of central arch of the Jama Masjid were restored as per original (pl. LXVI). The corner *bun* was reconstructed after dismantling the dilapidated one. The hair cracks on the roof of Salim Chishti's tomb were treated with a thin coat of neat cement to prevent the seepage of water. The work of paving the flagstones around the Mariam's House was done.

5. WAHA-UD-DIN'S TOMB AND MOSQUE, FATEHPUR SIKRI, DISTRICT AGRA.—Worn out veneer and *dasa* stones, brackets, pillars and the missing *guldasta* over parapet wall was reconstructed and the joints were pointed.

6. TOMBS OF SADIQ KHAN AND SALABAT KHAN, GELANA, DISTRICT AGRA.—The flagstones were laid to the floor of monuments. The decayed plaster of walls was removed and replastered. The missing steps on the east, west, north and south sides were restored matching the original.

7. DHAKRI-KA-MAHAL, GOPALPURA, DISTRICT AGRA.—Dead and decayed plaster on the walls of rooms and verandah was removed and replastered.

8. JASWANT SINGH-KI-CHHATRI, PAJWARA, DISTRICT AGRA.—The northern and western com pound walls were underpinned in patches and the missing steps were restored.

9. AKBAR'S TOMB, SIKANDARA, DISTRICT AGRA.—The bulged out portion of the compound wall was taken out and reconstructed.

10. MARIAM'S TOMB, SIKANDARA, DISTRICT AGRA.—Decayed and dead plaster on the walls of *dalan* was removed and replastered. The walls of the main mausoleum were properly washed with colour matching the original.

11. DANDESHWAR TEMPLE, DANDESHWAR, DISTRICT ALMORA.—A retaining wall, *dhuni* and *bhogsala* were added to the temple complex after dismantling the later one to keep the monument presentable.

12. BADRINATH GROUP OF TEMPLES, DWARAHAT, DISTRICT ALMORA.—Dilapidated compound wall was reconstructed and provided with two iron gates. The barbed wire fencing on iron angle posts was done over the compound wall to stop the thoroughfare. The *bhogsala* and *dhuni* attached to *antarala* at a later date giving ugly appearance and impairing the front view were shifted on the one side and a retaining wall was provided.

13. GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA.—The bulged out portion of compound wall was taken out and restored. A canopy was added to the *mandapa* to avoid percolation of rain water.

14. RUDRANATH TEMPLE, GOPESHWAR, DISTRICT CHAMOLI.—Decayed parts of the wooden canopy over the *sikhara* were repaired with deodar wood after temporarily removing the copper sheet and the same was refixed over the wooden canopy. A compound wall provided with iron gate was constructed around the temple. The joints of the stone flooring were pointed.

15. ASOKA PILLAR, KALSI, DISTRICT DEHRADUN.—The protected area was fenced with barbed wire on angle iron posts. The approach road was provided with an iron gate to check the thoroughfare.

16. MOSQUE AND TOMB OF MAKHDUM JAHANIAN, KANNAUJ, DISTRICT FARRUKHABAD.—Fresh lime concrete was laid on the roof surface after removing the loose and decayed one.

17. MADAN MOHAN TEMPLE, BRINDABAN, DISTRICT MATHURA.—Damaged retaining wall was restored by underpinning and plastering.

18. TALAB KHAN'S TOMB, AZAMPUR, DISTRICT MORADABAD.—The compound wall of the monument was underpinned and moulded ornamentation on plaster was restored.

AURANGABAD CIRCLE

Maharashtra

19. CAVES, AJANTA, DISTRICT AURANGABAD.—The damaged ramp of the hill at entrance was concreted and plastered. The fallen retaining walls supporting the ramp were also reconstructed at three places. The work of extension of the courtyard in front of Booking Office is in progress. Pipe railing over the wooden posts was provided in Cave 17 around the pillars for the protection of mural paintings.

20. AURANGABAD CAVES, AURANGABAD, DISTRICT AURANGABAD.—In continuation of previous year's work *(1987-88,* p. 173), the restoration of the damaged steps of Cave 1 to 5 was completed. Damaged parapet due to rock slide was also attended to and courtyard in front of Cave 3 was concreted.

21. TOMB OF RABIA DAURANI (BIBI-KA-MAQBARA), AURANGABAD, DISTRICT AURANGABAD.—In continuation of previous year's work *(1987-88,* p. 173) the missing ornamental and floral designs of the main tomb were reproduced as per original. The damaged cornice and *chhajja* was restored as per original. Pointing the open joints of the marble slabs of dome of the main tomb is in progress. Decayed Mughal plaster from the eastern end of the main gate of the Maqbara was removed and replastered as per original.

22. DAULATABAD FORT AND MONUMENTS, DAULATABAD, DISTRICT AURANGABAD.—Loose and decayed plaster of the Chand Minar was removed and replastered with specially prepared lime mortar (pl. LXVII).

Flooring stones of the Hemadpanti temple inside the fort were set over a concrete bed and heavy weathering course over the stone roof was removed and fresh light weight concreting was carried out. Damaged stone *chhajja* of the temple was reproduced in R.C.C. and matched with the stone texture (pl. LXVIII). Loose and decomposed plaster of the Am Khas was removed and replastered in combination mostar.

23. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD.—Missing 8 m long rock-cut roof over the left hand side cell of the Cave 10 was recast in R.C.C. to protect the sculptures from sun and rain. Rock cut facade of the cell was reproduced in R.C.C. over the longitudinal R.C.C. beam and matched with the rock texture.

Damaged portion of both the porches of the Cave 16 B was restored in R.C.C. and matched with original rock texture. Two temporary masonry support pillars of the cave were replaced with R.C.C. pillars and matched with the adjacent pillars. The damaged rock cut lintels over these pillars were also strengthened.

Caved-in portion of rock on the right at the entrance of Cave 14 was also filled up properly with masonry and surface matched with the original rock.

24. ANCIENT MOUND, PAITHAN, DISTRICT AURANGABAD.—The work of fencing with iron angles is in progress.

25. GHRISHNESHWAR TEMPLE, VERUL (ELLORA), DISTRICT AURANGABAD.—The fallen portion of south-east corner of *prakara* wall was reconstructed with the available stones as per original.

26. UKKADESHWAR TEMPLE, UKKADPIMPRI, DISTRICT BEED.—Debris all round the temple was cleared. Reconstruction of fallen portion of northern wall was taken up using the available stones and the work is in progress.

27. CAVES, KONDIVATE, DISTRICT BOMBAY.—Restoration of damaged rock-cut pillars of the caves were carried cut in R.C.C. matching the original texture.

28. FORT, BHANDAK, DISTRICT CHANDRAPUR.—Reconstruction of the fallen wall of the stepped well inside the fort is in progress.

29. FORT WALL AND GATES, CHANDRAPUR, DISTRICT CHANDRAPUR.—Two breaches in the city wall of Chandrapur were reconstructed with available stones as per original. Pointing the open joints of the wall near Ramala Tank is in progress.

30. GOND RAJA'S TOMB, CHANDRAPUR, DISTRICT CHANDRAPUR.—Two breaches in the compound wall of the Gond Raja's tomb were reconstructed with the available stones.

31. GROUP OF TEMPLES, MARKANDA, DISTRICT GADCHIROLI.—The out-of-plumb *prakara* wall near the main entrance was dismantled carefully after proper documentation and the same was reconstructed over a new stepped masonry foundation.

32. SHANWARWADA, PUNE, DISTRICT PUNE.—Pointing the open joints of the enclosure wall was taken up. The damaged masonry was repaired as per original and the top covered with stones pieces and the drain was made functional. Wood preservative was also provided to ancient wooden members of Naqarkhana.

33. ELEPHANTA CAVES, ELEPHANTA ISLAND, DISTRICT RAIGAD.—A part of the fallen rock from the facade of Cave 3 was taken up for repairs. Reconstruction of six missing pillars and one pilaster was taken up in R.C.C. in a row, to support the facade. One R.C.C. beam of the same size and shape as that of original one was cast over the six pillars and pilasters so as to support the unsupported rock mass of the facade. Pillars and the beam over them were matched with the original texture and colour of the parent rock. Laying of masonry contour drain over the Cave 3 and 4 was also started.

34. JIJAMATA'S WADA, PACHAD, DISTRICT RAIGAD.—Debris accumulated inside the enclosed area of the Wada was cleared. Fallen portions of the southern, northern and western fortification walls were reconstructed and top of the wall watertightened. Fallen bastion of northern fortification wall was also reconstructed.

35. RAIGAD FORT, RAIGAD, DISTRICT RAIGAD.—Repairs to the portion of the *samadhi* of Shivaji damaged due to lightening were taken up. The dislodged stones of the masonry platform were reset and the cracks were thoroughly grouted with liquid cement mortar. The cracks in the dome were filled up with epoxy and the dome was properly strengthened. The damaged portion of stone canopy was restored in R.C.C. and matched with original stone texture. The hair cracks in the canopy were also filled up with epoxy compound. The damaged stone *jali* was repaired by joining the broken pieces with suitable epoxy compound.

All the stone pieces of finial *(kalasa)* were joined together in their position using dowels and epoxy compound. The base of the finial was broken into six pieces, the same were joined together

as per original. The masonry dome was plastered with combination mortar. Apart from this, the fallen portion of masonry wall of Bazar Peth, Palki Darwaza and Meena Darwaza were also attended to.

36. TEMPLE OF AMBARNATH, AMBARNATH, DISTRICT THANE.—The protected area was fenced with barbed wire.

37. FORT, BASSEIN, DISTRICT THANE.—Replacement of damaged teak wood planks and rafters of the roof of St. Gonsala Church was in progress.

BANGALORE CIRCLE

Karnataka

38. OLD DUNGEON AND FORT, BANGALORE, DISTRICT BANGALORE.—The collapsed south-western bastion of the Delhi gate was reconstructed in its original form. The leaky roof of the Ganesa shrine within the gateway was rendered watertight.

39. KALLESVARA TEMPLE, ANGOOR, DISTRICT BELLARY.—The out of context size-stone masonry buttress and the dwarf parapet of the facade were removed and the out-of-plumb wall was reset as per the original.

40. KALLESVARA TEMPLE, BAGALI, DISTRICT BELLARY.—The masonry buttress provided to keep intact and bulged outer face of the southern wall of the *mandapa* was dismantled alongwith the wall. After proper consolidation of the foundation, the wall was reconstructed as per the original alignment (pl. LXIX).

41. HAZARA RAMACHANDRA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—The sunken two-tiered basal platform of the broken *Garuda-stambha* alongwith its enclosure wall were dismantled and reset as per the original after providing a cement-concrete foundation for the pillar instead of the original sand-bedding. The out-of-plumb south-eastern corner of the Virabhadra temple was dismantled and reconstructed as per the original. The displaced flight of steps with the elephant balustrade were restored. Using the available members, the *prakara* of the temple, which was collapsed, was reconstructed. The recently exposed tank was conserved by resetting its top courses and by aligning the channel on the west with proper gradient (pl. LXX).

42. PATTABHIRAMA TEMPLE, KAMALAPURAM, DISTRICT BELLARY.—The obstructive masonry props, provided to support the cracked bead of the *maha-dvara* were dismantled after strengthening the beam by inserting I section girders. The broken slabs covering the central bay of the *maha-dvara* were replaced with new ones. The precariously overhanging walls of the uppermost tier of the *gopura* of the *maha-dvara* was strengthened by inserting C-section girders internally. The open-to-sky roof of the *gopura* of the same *maha-dvara* was closed with brick masonry and finished to match with

the original. The out-of-plumb veneering of the inner side of the southern *prakara* and the outer side of the northern *prakara* were dismantled and reconstructed as per the original providing afresh the missing slabs.

43. ROYAL ENCLOSURE, KAMALAPURAM, DISTRICT BELLARY.—The out-of-plumb and collapsed southern portion of the western enclosure wall and the outer enclosure wall on the southern side was also dismantled and reset as per the original. The structure to the north of recently exposed T-shaped tank was reconstructed by providing steps on the southern side and the original rubble wall on the north was raised as a preventive measure.

44. ZANANA ENCLOSURE, KAMALAPURAM, DISTRICT BELLARY.—The out-of-plumb enclosure wall near the north-eastern watch-tower was dismantled and reconstructed as per the original. The decayed plaster of the watch-tower was removed and replastered with lime-mortar.

45. KRISHNA TEMPLE, KRISHNAPURAM, DISTRICT BELLARY.—The out-of-plumb northern face of the eastern *maha-dvara* was dismantled. After providing a bedding of boulders and cement-concrete, the same was reconstructed by replacing the missing stone members with new ones. The raised facade *mandapa* of the *maha-dvara* was reconstructed with original architectural members and wherever broken they were mended using stainless steel clamps or pins. The roof of the central bay of the *maha-dvara* was covered with new slabs and rendered watertight. Masonry supports propping up the broken beams in the *navaranga, mukha-mandapa,* northern *maha-dvara* and the Devi shrine, were removed after strengthening the beams by either providing I-section girder or using stainless steel clamps. Particularly, one of the broken pillars and the capital in the *navaranga* were mended using stainless steel clamps or pins. The out-of-plumb southern portion of the eastern *outer prakara* was dismantled and reconstructed as per the original and the core was filled with brick masonry.

46. MALLIKARJUNA TEMPLE, KURUVATTI, DISTRICT BELLARY.—Decayed wooden beams provided within the brick *sikhara* were replaced. Collapsed portion of the same was restored to its original form.

47. PARVATI TEMPLE, SANDUR, DISTRICT BELLARY.—The thick accretionary coat of lime-wash over the surface of the wall and the sculptures in the *deva-koshthas* is being removed to bring out the original surface.

48. VITTHALA TEMPLE, VENKATAPURAM, DISTRICT BELLARY.—The ugly masonry props, obstructing the *maha-dvara,* were removed after strengthening the broken lintel and the uprights of the doorjamb of the *maha-dvara* by mending *in situ* using stainless steel pins and epoxy resin. The *navaranga* roof was rendered watertight in the usual manner. The dismantled *mandapa* located to the south-east of the temple and outside the *prakara* was reconstructed upto *prastara,* after strengthening the foundation with boulder and concrete bedding.

49. GROUP OF MONUMENTS, AIHOLE, DISTRICT BUAPUR.—Missing steps were provided to the tank located to the east of Badiger Gudi.

50. SANGAMESVARA TEMPLE, BEVOOR, DISTRICT BUAPUR.—The disintegrated lime-concrete over the roof was removed and a fresh lime-concrete course was laid. A dwarf retaining wall was built and the intervening space was filled with earth to cover the exposed course of the foundation.

51. ASAR MAHAL, BUAPUR, DISTRICT BUAPUR.—The missing and damaged edge-stones of the tank in front of this edifice and those of the steps were replaced with new stones matching with the original. In the central hall of the Mahal, the decayed plaster of the wall was removed and replastered using combination-mortar.

52. GOL-GUMBAZ, BUAPUR, DISTRICT BUAPUR.—Preservatives were applied to the wooden members such as the canopy over the counterfeit graves, railings, etc. The fallen arches of the *dalans* in the Gol-Gumbaz complex were reconstructed in random rubble masonry matching with the existing arches.

53. MONUMENTS AT BUAPUR, DISTRICT BUAPUR.—The area around Ali I Rouza, Badikaman, Gagan Mahal, Masa Bavdi and the moat around *Arquilah* were fenced with barbed wire.

54. NAGNATHA TEMPLE, NAGARAL SAMAT, DISTRICT BUAPUR.—The unequally settled external wall of the temple covering the *garbha-griha* and the *sabha-mandapa* was dismantled after careful recording. After enhancing the strength of the foundation by providing a concrete bedding, the dismantled members were reconstructed as per the original (pl. LXXI). The accumulated debris around the temple was levelled and the area fenced.

55. AMRITESVARA TEMPLE, AMRITAPURA, DISTRICT CHKMAGALUR.—The missing stone members of the *garbha-griha* and the *navaranga* of the Sarada shrine were replaced with new stones. The dismantled roof slabs were refixed and rendered watertight. Fencing along the northern side of the complex is in progress.

56. FORT AND TEMPLES, CHITRADURGA, DISTRICT CHITRADURGA.—The sunken southern portion of the *Bombe mandapa* was dismantled after recording and the same was reconstructed as per the original after strengthening the foundation. A damaged pillar was replaced with new one matching with the original.

57. KATTALE BASTI, BARKUR, DISTRICT DAKSHINA KANNADA.—The debris accumulated around the *basti* was levelled and the area was fenced.

58. ANANTAPADMANABHA TEMPLE, KARKAL, DISTRICT DAKSHINA KANNADA.—The disintegrated plaster of the outer face of the sanctum was removed and replastered. Damaged wooden pillars on

the southern side of the cloister *mandapa* and the decayed rafters of the tiled roof of the sanctum were replaced with new ones matching with the original in design. New flooring and plastering was done to the *pakasala.*

59. MANGALADEVI TEMPLE, MANGALORE, DISTRICT DAKSHINA KANNADA.—The complete outer elevational aspect of the *vimana* was dismantled for reconstruction.

60. MUKTESVARA TEMPLE, CHOWADADANPURA, DISTRICT DHARWAR.—The work of providing missing veneering stones was completed.

61. SIDDHESVARA TEMPLE, HAVERI, DISTRICT DHARWAR.—The bulged outer veneer of the southern face of the *sikhara* which was dismantled was reset to plumb after consolidating the core.

62. JAINA TEMPLE, LAKKUNDI, DISTRICT DHARWAR.—In the *navaranga,* the stone columns provided to support the cracked beams were removed after strengthening the beams by inserting I-section girders. The decayed weatherproof course over the *navaranga* was removed and new course was laid with proper gradient. On the exterior wall surface, the flush-pointing done earlier to the joints of the stones was raked out and recess-pointed. The accretionary plaster-flooring of the *navaranga* and the *antarala* was removed to expose the original stone flooring. The same was levelled by resetting the sunken slabs and replacing the damaged and missing ones. The roof of the sub-shrine was rendered watertight.

63. MUSKIN BHAVI, LAKKUNDI, DISTRICT DHARWAR.—The damaged roof slabs of the landing of the well were replaced besides levelling the area around with outward gradient to prevent the entry of rain water into the well. The *mukha-mandapa* of the Manikesvara temple adjoining the well was dismantled and reconstructed after providing the missing architectural members, matching in design with the original and its roof was watertightened.

64. KADAMBESVARA TEMPLE, RATTIHALLI, DISTRICT DHARWAR.—The disintegrated waterproof course was removed and a fresh layer was provided after filling and grouting the joints of the roof slabs. The joints of the *sikhara* were recess-pointed. Broken beams in the *sabha-mandapa* were strengthened by inserting I-section girders and the supports were removed.

65. KESAVA TEMPLE, BELUR, DISTRICT HASSAN.—Portion of the collapsed southern *prakara* was reset as per the original. Remodelling the stucco-work on the *gopura* of the *maha-dvara* is in progress.

66. HOYSALESVARA TEMPLE, HALEBID, DISTRICT HASSAN.—The existing decayed lime-concrete over the roof of the entire temple was removed. Laying of new course of concrete is in progress.

67. FORT AND DUNGEON, MANJARABAD, DISTRICT HASSAN.—Missing approach steps were provided using new stones besides removing the vegetation covering the curtain wall.

68. SADASIVA TEMPLE, NUGGEHALLI, DISTRICT HASSAN.—The out-of-plumb *bhitti* of the *mandapa* was dismantled for reconstruction. The work is in progress.

69. BHOGANANDISVARA TEMPLE, NANDI, DISTRICT KOLAR.—The cracked pointing of the *sikhara,* causing leakage was raked out and the joints were grouted with cement-mortar and pointing was done with epoxy mixture. A concealed pipeline outlet was provided for draining the *abhisheka* water. Undulating edge stones of the *kalyani* were reset. A broken beam of the cloister *mandapa* around the *kalyani* was replaced.

70. NARAYANASVAMI TEMPLE, MELKOTE, DISTRICT MANDYA.—The damaged stucco ornamenta tions of the *sikhara* were remodelled as per the original.

71. SPOT WHERE TIPU'S BODY WAS FOUND, SRIRANGAPATNA, DISTRICT MANDYA.—A toe-compound wall was constructed around the spot and a small garden was raised after levelling the area.

72. TIPU'S PALACE, DARIA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA.—The wooden balcony in the northern side of the palace was refixed in its original position besides strengthening the joints.

73. NAMBINARAYANA TEMPLE, TONNUR, DISTRICT MANDYA.—The out-of-plumb veneering of the western wall of the *garbha-griha* of the temple was dismantled and reset as per the original. The decayed lime-plaster over the brick superstructure was removed and replastered after raking the joints. The damaged stone paving of the inner courtyard and the *navaranga* of the Devi shrine was removed and relaid.

74. SRIKANTHESVARA TEMPLE, NANJANGUD, DISTRICT MYSORE.—Two damaged stone-pillars of the *pakasala* were replaced with new ones. The stone-paved flooring was also reset.

75. VAIDYESVARA TEMPLE, TALKAD, DISTRICT MYSORE.—Decayed plaster of the brick *sikhara* of the Vaidyesvara and the Devi shrines was removed and a fresh lime-plaster was provided.

76. GAURISVARA TEMPLE, YELANDUR, DISTRICT MYSORE.—The out-of-plumb elevation of the *mandapa* and *mukha-mandapa* of the Devi shrine was dismantled and reconstructed.

77. PARSVANATHA BASTI, HUMCHA, DISTRICT SHIMOGA.—Damaged wooden rafters of the tiled-roof were replaced with fresh ones besides replacing the broken tiles.

78. KAITABHESVARA TEMPLE, KOTIPURA, DISTRICT SHIMOGA.—The joints of the roof-slabs were pointed with epoxy mixture.

79. PARSVANATHA BASTI, KUBATTUR, DISTRICT SHIMOGA.—The out-of-plumb wall of the cloister *mandapa* was dismantled for reconstruction. The work is in progress.

80. RAMESVARA TEMPLE, KUBATTUR, DISTRICT SHIMOGA.—The accretionary earth-filling over the roof was removed and the dislodged roof-slabs were reset Windows were provided to let in more light and air.

81. RATNATRAYA BASH, BILGI, DISTRICT UTTARA KANNADA.—Out-of-plumb portion of the cloister *mandapa* was dismantled after careful recording. Reconstruction as per the original form is in progress.

BHOPAL CIRCLE

Madhya Pradesh

82. OLD FORT, LANJI, DISTRICT BALAGHAT.—In continuation of last year's work *(1987-88,* p. 179), the restoration of collapsed portion of stone brick masonry fort wall remained in progress' An mm gate has been provided at the main entrance. The brick temple inside fort has been enclosed with barbed wire fencing.

83. KAMLAPATI PALACE, BHOPAL, DISTRICT BHOPAL.- In continuation of last year's work (1987-88, p. 179), the old damaged doors have been replaced with fresh teak wood door shutters with frames and painted with two coats of synthetic enamel paint over one coat of wood primer. M.S. grills have been provided to the window opening at top floor.

84. CHOPRA TANK, KHAJURAHO, DISTRICT CHHATTARPUR.- In continuation of last year's work (1987-88. p. 179), replacement of the old low lying barbed wire fencing on stone posts around Chopra tank with high level barbed wire fencing on angle iron posts and restoration of parapet wall of tank remained in progress.

85. GHANTAI TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR.- In continuation of last year's work (1987-88, p. 179), barbed wire fencing on angle iron posts and lime concreting of approach path and apron to check the cutting of path and ingress of rain water, remained in progress.

86. JARDINE MUSEUM, KHAJURAHO, DISTRICT CHHATTARPUR.- Damaged and missing portion of the flooring has been restored with flagstone flooring.

87. KAKRAMARH, KHAJURAHO, DISTRICT CHHATTARPUR.- In continuation of last year's work (1987-88, p. 179), the restoration of old damaged retaining wall and enclosing the area with G.I. barbed wire fencing on angle iron posts remained in progress.

88. LALGUAN MAHADEVA TEMPLE, KHAJURAHO, DISTRICT CHHATTARPUR.- In continuation of last year's work (1987-88, p. 179), the restoration of damaged and missing courses of façade of shrine, platform flooring and enclosing with G.I. barbed wire fencing on angle iron posts remained in progress.

89. RANGMAHAL PALACE, HATTA, DISTRICT DAMOH.—Decayed and damaged concrete of the roof and floor has been replaced with fresh lime concrete and roof made watertight. The damaged battlements have also been restored.

90. SIVA TEMPLE, KANARA BARI, DISTRICT DAMOH.—The damaged and missing facade stone of *sikhara* have been restored. The damaged and missing door lintel and floor and steps of the *garohagriha* have also been restored with fresh fine chisel cut stones. The restoration of R.R. stone masonry compound wall on old traces in lime mortar is in progress.

91. BIR SINGH PALACE, DATIA, DISTRICT DATIA.—Replacement of the old damaged and decayed concrete of roof terraces with fresh lime concrete to check the ingress of rain water and make roof terraces watertight is in progress.

92. BUDDHIST CAVES, BAGH, DISTRICT DHAR.—In continuation of last year's work *(1987-88,* p. 180), construction of two R.C.C. pillars, beams and slab in place of old decayed, damaged and missing stone rock cut pillars, beams and slab in eastern side in Cave 4 in addition to fourteen R.C.C. pillars already constructed and finished with rock toning in lime *surkhi* plaster matching to the original were taken up. The air gap between R.C.C. slab and concaved ceiling was filled with empty inverted earthen pitchers as done earlier to avoid impact of falling chunks, lime concrete has been laid over the layer of cement concrete on the roof of Cave 4,5 and 6 to check the ingress of rain water and made it watertight. The work is in progress.

93. GADASHAH'S PALACE, MANDU, DISTRICT DHAR.—The debris of the fallen portions of cells was removed. The old decayed, damaged and missing floor concrete of cells has been replaced with fresh lime concrete. Damaged and missing decorative door sil lintel *jails* have been restored with similar decorative designs. The work is in progress.

94. KAPOOR TALAV, MANDU, DISTRICT DHAR.—In continuation of last year's work *(1987-88,* p. 180), the damaged enclosure wall of the tank was restored in R.R. stone masonry and painted in lime mortar to check the ingress of water. Settled debris was removed and the tank desilted.

95. NEELKANTH TEMPLE, MANDU, DISTRICT DHAR.—The decayed and damaged approach steps leading to the temple were restored with fresh fine chisel dressed stones. The flight of steps leading to the sanctum was also replaced. The work is in progress.

96. SOMVATI KUND, MANDU, DISTRICT DHAR.—In continuation of last year's work *(1987-88,* p. 180), the damaged, deteriorated and missing approach steps leading to water level were restored with fine chisel dressed ashlar stone masonry. The settled debris was removed and the tank desilted.

97. TAVELI MAHAL, MANDU, DISTRICT DH/ „—In continuation of last year's work *(1987-88,* p. 180), the damaged and missing *chhajjas* of ground floor were restored with fresh fine chisel dressed lime stone and the railing of flight of steps and first floor was replaced.

98. ROYAL PALACE COMPLEX, MANDU, DISTRICT DHAR.—In continuation of last year's work *(1987-88,* p. 180), the western hall was restored on the available traces. The dead and decayed floor concrete near Hammam was replaced with fresh lime concrete.

99. DELHI GATE, CHANDERI, DISTRICT GUNA.—In continuation of last year's work *(1987-88,* p. 181), the bulged portion of bastion was dismantled and restored and the roof terrace watertightened by laying fresh lime concrete.

100. FORT, CHANDERI, DISTRICT GUNA.—In continuation of last year's work *(1987-88,* p. 181), fallen debris was removed from the palace to the west of Naukhanda and damaged missing walls were restored in C.R. stone masonry matching to the original.

101. JAMA MASJID, CHANDERI, DISTRICT GUNA.—Replacement of old, dead and decayed terrace concrete with fresh lime concrete and restoration of damaged and missing flooring of courtyard is in progress.

102. KOSHAK MAHAL, CHANDERI, DISTRICT GUNA.—In continuation of last year's work *(1987-88,* p. 181), the missing stones of outer facade of western wall were restored with fine chisel dressed ashlar stones.

103. SINGHPUR PALACE, CHANDERI, DISTRICT GUNA.—In continuation of last year's work *(1987-88,* p. 181), the flagstone flooring of display galleries were replaced with polished Kotah stone flooring. Outer door and window openings were provided with M.S. grill. Drilling of tube well, construction of pumping house, providing R.C.C. overhead tank and laying of pipe-line through Executive Engineer, P.H.E.D., Guna, is in progress.

104. FORT, GWALIOR, DISTRICT GWALIOR.—In continuation of last year's work *(1987-88,* pp. 181-182), the old, decayed and damaged roof concrete of Assikhamba has been replaced with fresh lime concrete and dome plastered and made watertight to check the ingress of rain water. The door openings of *baoli,* basement and terrace were provided with M.S. collapsible shutters. Open space around the *baoli* was paved with flagstone flooring and provided with G.I. pipe railing.

The collapsed retaining wall of the fort adjoining the Chaturbhuja temple and cells over it was restored in stone masonry matching the original and roof of cells covered with stone slab and finished with lime concrete terrace. The old damaged and decayed wooden door of the main shrine was replaced with M.S. collapsible shutter.

The old wooden doors and windows of Hathi Pole gate were removed and the openings were provided with M.S. collapsible shutters and M.S. grills matching the adjoining stone *jalis.*

The compound in front of the Hospital and Jail buildings was enclosed with dwarf wall mounted with M.S. grill. The old flagstone flooring of display galleries was replaced with cement concrete floor, besides providing separate M.S. grill gates to the compound wall for Museum and sub-Circle office.

The damaged and fallen portions of the compound wall of Rock-cut Jaina collosi (Ek Pathar-Ki-Baoli) was also restored in course rubble stone masonry and the fore-court in front of Cave 1 and 2 was paved with stone pitching on concrete base.

The old decayed and damaged concrete of roof terrace of Mansingh's palace was replaced with fresh lime concrete to make roof watertight. The door opening of steps leading to roof and basement were provided with M.S. channel shutters to stop the public entry to roof and basement cells. Conservation of reinforced coursed rubble stone masonry retaining wall to provide support to the foundation of bastion 3 is in progress.

105. TOMB OF MOHAMMAD GHAUS, GWALIOR, DISTRICT GWALIOR.—The damaged and missing compound wall was restored in C.R. stone masonry to check the tresspassing.

106. TEMPLE OF CHAUNSATH YOGINI, BHERAGHAT, DISTRICT JABALPUR.—In continuation of last year's work *(1987-88,* p. 182), the roof terrace of circular temple was watertightened and the joints of the outer wall pointed.

107. DURGADEVI TEMPLE, TIGWAN, DISTRICT JABALPUR.—R.R. stone masonry supports were dismantled and the cracked arches reset in lime mortar. Restoration of ashlar stone masonry and levelling of the area is in progress.

108. MAHADEO TEMPLE, ASIRGARH, DISTRICT KHANDWA.—The debris of fallen portion were removed and walls restored.

109. BIBI SAHIB'S MASJID, BURHANPUR, DISTRICT KHANDWA.—The decayed and deteriorated stones were replaced with fine chisel dressed stone. Replacement of damaged and decayed flooring with fresh lime concrete flooring is in progress.

110. RUINED PALACE INSIDE FORT, BURHANPUR, DISTRICT KHANDWA.—The damaged and fallen wall on river side path were restored in R.R. stone masonry and pointed in lime mortar.

111. CHAUBARA DERA 1, UN, DISTRICT KHARGONE.—Replacement of stone pitching with flag stone flooring and construction of compound wall in C.R. stone masonry in place of barbed wire fencing is in progress.

112. BEGAM MAHAL, CHAUGAN RYOTWARI NEAR RAMNAGAR, DISTRICT MANDLA.—Underpinning the wall cavities with stone masonry, removal of earth deposited in cells and replacement of old damaged and decayed concrete with fresh lime concrete is in progress.

113. FORT, AJAIGARH, DISTRICT PANNA.—In continuation of last year's work *(1987-88,* p. 182), the cell having Jaina images was covered with stone slab and made watertight by laying a layer of lime concrete. The work is in progress.

114. ROCK-SHELTERS, BHIMBETKA, DISTRICT RAISEN.—The excavated trenches were provided with G.I. railing. The approach path leading to the shelters was provided with stone edging and paved with lime concrete with stone boulders. The work is in progress.

115. BUDDHIST MONUMENTS, SANCHI, DISTRICT RAISEN.—In continuation of last year's work (*1987-88,* p. 182), the paving of approach path to Stupa 1 and 3 and old Museum building with flagstone flooring was completed. The restoration of Stupa 4 and paving of outer periphery of Stupa 3 and 4 with flagstone flooring is in progress.

116. FORT, DHAMONI, DISTRICT SAGAR.—Eradication of vegetational growth from the fort wall and adjoining area and restoration of damaged portion of fort wall in R.R. stone masonry is in progress.

117. MONASTERY, RANOD, DISTRICT SHIVPURI.—Restoration of damaged wall and arches in fine chisel dressed ashlar stone masonry is in progress.

118. MALADEVI TEMPLE, GYARASPUR, DISTRICT VIDISHA.—The flooring in front of the temple was restored with fine chisel dressed cut stone flooring over concrete base and the approach steps were relaid with fine chisel dressed cut stone. The damaged parapet wall was also restored with fine chisel dressed ashlar stone masonry.

BHUBANESWAR CIRCLE

Madhya Pradesh

119. DANTESWARI DEVI TEMPLE, DANTEWADA, DISTRICT BASTAR.—The dilapidated *simhadvara* and *mukhamandapa* of the temple was taken up for repairs and completed.

120. BHIMA-KICHAKA TEMPLE, MALHAR, DISTRICT BILASPUR.—The out-of-plumb architectural members of the temple were dismantled and reset and watertightened. The undulated floor was removed and reset maintaining proper slope for easy drainage of rain water.

Orissa

121. BUDDHIST SITE, LALITAGIRI, DISTRICT CUTTACK.—The restoration work of the Stupa 1 on the hill top was completed. The conservation work of recently exposed apsidal *chaityagriha* was also taken up and the resetting of the available moulded basement was done as per original. The missing portions of the wall were also restored upto plinth level to avoid water stagnation.

122. BHRINGESVAR MAHADEVA TEMPLE, BAJRAKOT, DISTRICT DHENKANAL.—The area around the temple was fenced and grill gate provided.

123. ROCK-CUT VISHNU, RASOL, DISTRICT DHENKANAL.—Projected area was fenced with barbed wire and minor repair work to the image was taken up.

124. PASCHIMA SOMANATH, BHUBANESVAR AND KAPILESVAR TEMPLES, BOUDH, DISTRICT PHULBANI.—The compound wall was white-washed and gates and grills were painted. All around the protected area was. fenced and *bhogasala* of the deity repaired. Platform adjacent to Ugra-Tara and other minor deities was also restored by relaying new stones.

125. TEMPLES OF NILAMADHAVA AND SIDHESVARA, GANDHARADHI, DISTRICT PHULBANI.—The entire protected area was cordoned off with barbed wire fencing on iron angle posts with gates on all sides. Minor repairs were also attended to.

126. BHASKARESVAR TEMPLE, BHUBANESWAR, DISTRICT PURI.—A stone-paved apron was provided to have easy drainage of rain water.

127. LINGARAJA TEMPLE COMPLEX, BHUBANAESWAR, DISTRICT PURI.—The Lingaraja temple is the best surviving example of developed Kalinga temple style and standing in the centre of a vast courtyard. The eroded stone slates of the flooring of the courtyard on the northern side was taken up for chiselling and the badly damaged stones were replaced by new ones. Besides, a few dilapidated small shrines were dismantled and reset as per the original.

Repairs to the Papanasini tank were also taken up. The collapsed boundary wall was restored. Missing stone steps were replaced with new ones. The vegetational growths were removed. The area around was fenced for misuse of the tank.

128. MUKTESVAR-SIDDHESVAR TEMPLE-COMPLEX, BHUBANESWAR, DISTRICT PURL—The much undulated and narrow apron of Siddhesvar temple was dismantled and refixed in proper plumb with extension of about one metre all around to stop seepage of water into the foundation. The undulated platform of the temple was also attended to by way of chiselling of the worn-out pieces and replacing the broken ones.

129. ROCK-CUT CAVES, UDAYAGIRI-KHANDAGIRI HILLS, BHUBANESWAR, DISTRICT PURI.—The narrow and badly shaped approach pathway leading to the caves on Khandagiri Hill was provided with wider straircase with moderate landing space at a gap of 8 to 10 steps.

130. CHAUSATH-YOGINI TEMPLE, HIRAPUR, DISTRICT PURI.—One metre stone apron was provided allround the temple.

131. SUN TEMPLE, KONARAK, DISTRICT, PURI.—In order to avoid stagnation of water the approach road leading to Sun temple was paved with stone.

The repairing/restoration and other conservation works around *jagamohana* are in progress.

132. JAGANNATHA TEMPLE, PURI, DISTRICT PURL—The work of deplastering of the main temple is in progress and the consolidation of the dilapidated Surya temple was completed.

CALCUTTA CIRCLE

West Bengal

133. JOR BANGLA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—Lime concreting was done on the roof terrace and watertightened. The cracks were filled up and deteriorated tiles were repaired and replaced besides providing apron around the temple (pl. LXXII).

134. MADANA MOHANA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—Restoration and repairing of the gateway were completed with special size bricks and ornamental portion repaired.

Bulged and hanging brick masonry of the *bhog-ghar,* both plain and ornamental portion was dismantled and repaired as per original (pl. LXXIII). The arches, vaulted roof, pillars and ornamental portions were restored with special size bricks. The compound wall was watertightened.

135. MURALI MOHANA TEMPLE, BISHNUPUR, DISTRICT BANKURA.—Structural repairs and restoration of the southern and northern and north-eastern porch of the temple were completed and the four corners were also strengthened by providing extra foundation with R.C.C. beams, etc. Both ornamental and plain masonry work of laterite stone were also restored and mild-steel beams replaced (pl. LXXIV).

136. ANCIENT TEMPLES, BAIDYAPUR, DISTRICT BURDHAMAN.—The area around was fenced with barbed wires and cattle-proof gates with shutters.

137. GROUP OF TEMPLES, KALNA, DISTRICT BURDHAMAN.—Restoration of the ornamental brick work on the pedestal, pillar and cornice and plain brick work on the wall was completed. *Lime-surkhi* plaster on the walls of the Krishnachandra, Vaidyanatha and Ramachandra temples was also renewed. Lime terracing on the floor of the Krishnachandra and Vaidyanatha temples was also completed. Few doors and windows were renewed and painted.

138. COOCH BEHAR PALACE, COOCH BEHAR, DISTRICT COOCH BEHAR.—Damaged and missing rain-water pipes were replaced and , 3 mm thick metal sheets were provided on the top of the first floor below the circular dome. Filling of cracks, holes on the outer surface of the wall and roof below the water tank was completed. Wooden railings and masonry railings with decorated designs were provided on the left side as well as on the right side of the Durbar Hall. In the dancing and dining hall plastering, white washing, distempering, varnishing, painting in different colours, etc., were done. Minor repairs were done on the staircase, door of the Durbar and dining halls also. 5 mm thick plywood was provided in the Dining Hall with carvings as in the original.

139. HAMSESVARI TEMPLE, BANSBERIA, DISTRICT HOOGHLY.—The *bhoga-ghar* of the temple was thoroughly restored. The broken and missing tiles were replaced and ornamental plaster work executed. Boundary wall was also provided around the protected area. Iron gates wherever necessary were provided.

140. CHAMKATTI MASJID, GAUR, DISTRICT MALDA.—Missing brick work was restored. Floor, roof, plinth around the structure was concreted. Besides, the area around was fenced with barbed wires.

141. GUNMANT MOSQUE, GAUR, DISTRICT MALDA.—Barbed wire fencing with cattle proof gate was provided around the mosque.

142. TANTIPARA MASJID, GAUR, DISTRICT MALDA.—The roof and the terrace of the walls was concreted and missing brick work restored. The area was fenced with barbed wire.

143. ADINA MOSQUE, PANDUA, DISTRICT MALDA.—Dislodged portions of the mosque were reset and the roof and outer walls watertightened.

144. HAZARDUARI PALACE, MURSHIDABAD, DISTRICT MURSHIDABAD.—The damaged wooden beams were replaced and wooden door and windows repaired. Ornamental grills with locking arrangements were fixed.

145. IMAMBARA, MURSHIDABAD, DISTRICT MURSHIDABAD.—The damaged *chhajja* was restored and the adjacent roof watertightened. The roof of the western hall was also plastered.

146. TOMB AND MOSQUE OF MURSHID QULI KHAN, SABJI KATRA, DISTRICT MURSHIDABAD.—Missing portion of the dome was restored and the *chhajja* in front of the tomb repaired. Relaying of lime-concrete floor was done wherever necessary and watertightened.

CHANDIGARH CIRCLE

Haryana

147. KOS MINAR NO. 22, AURANGABAD, DISTRICT FARIDABAD.—The work of restoration, underpinning, pointing and plastering of the Kos Minar was taken up and completed by raking out the old, decayed and pulverized plaster and replacing the missing and bulged out portions of the platform.

148. KOS MINAR NO. 27, BHULWANA, DISTRICT FARIDABAD.—The work of restoration, under pinning, pointing, plastering of the Kos Minar was undertaken and completed by raking out the old, decayed and pulverized plaster and replacing the broken and bulged out portions of the platform.

149. KOS MINAR NO. 16 AND 17, GUDHPUR, DISTRICT FARIDABAD.—The old, decayed and pulverized plaster was raked out and the Kos Minar was replastered. The broken and bulged out portions of the platform were restored by underpinning and pointing.

150. KOS MINAR NO. 23, KHATELA, DISTRICT FARIDABAD.—The decayed and pulverized plaster was raked out and replastered wherever necessary. The bulged portion was repaired.

151. KOS MINAR NO. 21, KHERA SARAI, DISTRICT FARIDABAD.—The damaged portions of the structure were repaired by underpinning, pointing the joints and replastering.

152. KOS MINAR NO. 20, KHUSROPUR, DISTRICT FARIDABAD.—The decayed plaster was raked out and replastered. The damaged portions of the structure including the platform were repaired by underpinning and pointing.

153. RUINED QILA, HANSI, DISTRICT HISSAR.—In order to stop encroachment, the fencing work of the area on the eastern and northern side was taken up.

154. FIROZSHAH'S PALACE AND TAHKHANAS, HISSAR, DISTRICT HISSAR.—The fallen patches of *lakhauri* brick masonry around fortification wall were repaired by underpinning and pointing and the top of the palace, wherever found leaking, was watertightened.

155. KOS MINAR, DAHA, DISTRICT KARNAL.—The work of replastering the damaged and pulverized plaster and underpinning the disturbed and damaged patches of brick masonry was taken up and completed. In order to avoid encroachment, protected area was fenced with M.S. grill.

156. KOS MINAR, KOHAND, DISTRICT KARNAL.—The decayed and pulverized plaster was removed and replastered. The damaged, bulged out and fallen patches of brick masonry of the platform as well as Minar were also attended to by underpinning and pointing of the joints.

157. KABULI BAGH MOSQUE, PANIPAT, DISTRICT PANIPAT.—In continuation of last year's work *(1987-88,* p. 187) the restoration of fallen patches of brick masonry work was completed by underpinning, pointing the joints and restoration and strengthening the structure.

158. SHAIKH CHILLI'S TOMB, THANESAR, DISTRICT KURUKSHETRA.—The foundation of main tomb was stabilized by underpinning and pointing of the *lakhauri* brick masonry. The inner walls of the fortification were also attended to by underpinning and pointing of the joints. The work of laying concrete base around the tomb was taken up and is in progress.

159. SHAH JAHAN BAOLI, MEHM, DISTRICT ROHTAK.—Buff sandstone flooring around the wall of the *baoli* wherever found damaged was replaced and restored as per original. The pointing and underpinning work of disturbed and damaged patches of *lakhauri* brick masonry was also undertaken and completed.

Punjab

160. FORT, BHATINDA, DISTRICT BHATINDA.—In continuation of last year's work *(1987-88,* p. 187) the reconstruction of fallen bastion EOB-5 was in progress.

161. GATEWAY OF THE OLD SARAI, AMANAT KHAN, DISTRICT GURDASPUR.—The fallen patches of *lakhauri* brick masonry of the arches and walls on the ground floor as well as on the first floor cells were repaired by underpinning and restoration as per the original.

162. SARAI INCLUDING GATEWAY, DAKHNI, DISTRICT JALANDHAR.—The fallen patches of the brick masonry on south western and eastern wall was taken up for repairs. The pulverized and decayed concrete at the top of parapet wall was also raked out and reconcreted as per original.

1631 TOMBS OF MOHAMMAD MOMIN AND HAJI JAMAL, NAKODAR, DISTRICT JALANDHAR.—-The work of pointing the joints of brick flooring of the platform was taken up and is in progress.

164. KOS MINARS, NAKODAR, NOORMAHAL, DISTRICT JALANDHAR.—The work of consolidation, pointing, underpinning, replastering and repairing of Kos Minars at Tutkalan, Nakodar, Uppal, Veer Pind, Cheemkalan and Shampur were taken up and completed by removing the vegetational growth, replastering the decayed and pulverized ones and levelling the surroundings.

165. SARAI INCLUDING GATEWAY, NOORMAHAL, DISTRICT JALANDHAR.—Raking the pulverized and decayed mortar on the joint of the brick masonry of the cells on the right side of entrance gateway was raked out and repaired. The work is in progress.

166. ANCIENT STUPA, SANGHOL, DISTRICT LUDHIANA.—The excavated structure was restored and strengthened. The exposed portions of the stupa were also fenced with barbed wire.

DELHI CIRCLE

Delhi

167. LAL QILA, DELHI.—The marble parapet panels fixed with moulded pilasters over the eastern wall and pulverized cut marble steps of Diwan-i-Khas and Rang Mahal were restored. Missing ornamental brass plates of door of Moti Masjid were fixed as per the original (pl. LXXV). Decayed and worn out plaster of the western side wall of the Shah Burz was raked out and replastered with combination mortar.

168. ADILABAD FORT, NEW DELHI.—Dilapidated fortification wall was repaired in consonance with the original pattern by way of resetting of disturbed and bulged stone masonry, underpinning the undermined gaps and stabilizing all loose masonry and watertightening.

169. BARA-BATASHEWALA MAHAL, NEW DELHI.—Extensive structural repairs which consist of watertightening, underpinning, grouting and stitching of cracks and resetting of damaged masonry were carried out as per the original pattern.

170. HUMAYUN'S TOMB, NEW DELHI.—Structural conservation of the monuments in the complex under a phased programme which involves extensive watertightening of monument, stabilizing, underpinning and restoration of disturbed masonry with combination mortar as per original pattern and restoration of pulverized terrace concrete in conformity with the original was carried out.

171. JAHAZ MAHAL, NEW DELHI.—The work of restoration of damaged moulded red sandstone facade of the gate, watertightening, underpinning the masonry and restoration of stucco work was carried out in accordance with the original pattern.

172. KOTLA FIROZ SHAH, NEW DELHI.—Missing part of the southern fortification wall was restored to the height of extant remains followed by watertightening and pointing.

173. PURANA QILA, NEW DELHI.—The foundation of the collapsed southern fortification wall was exposed after removing the fallen debris and the damaged portions of the wall were reconstructed.

174. SHISH MAHAL, NEW DELHI—Extensive structural repairs which involves watertightening, underpinning and resetting the damaged masonry walls and arches was carried out strictly in accordance with the original pattern.

175. BALBAN'S TOMB, MEHRAULI, NEW DELHI.—Loose and overhanging stones were stablized in random rubble masonry and pointing in combination mortar.

176. QUTB COMPLEX, MEHRAULI, NEW DELHI.—The decayed lime concrete from Alai Darwaza was removed and fresh concrete laid strictly in accordance with the original pattern. A coat of plaster with combination mortar was also applied to render the top watertight.

Decayed and crushed stones on the circular flutings of the Qutb Minar, having floral designs, were taken out and replaced by new stones with original patterns reproduced.

GUWAHATI CIRCLE

Assam

177. GROUP OF FOUR MAIDANS, CHARAIDEO, DISTRICT SIBSAGAR.—Missing brick work, underpinning, pointing, flooring, filling up of cracks by grouting, watertightening etc. were done.

178. DEVIDOL, GAURISAGAR, DISTRICT SIBSAGAR.—Repairing of *sikhara* and filling up the cracks, pointing of the flooring and roofing wherever necessary were attended to and completed.

179. SIBADOL, GAURISAGAR, DISTRICT SIBSAGAR.—Repairing of *sikhara* and other structures and plastering of the *mukhamandapa* wherever necessary were attended to.

180. GHANSHYAM'S HOUSE, JOYSAGAR, DISTRICT SIBSAGAR.—Brick work, plastering, underpinning, pointing, terracing, flooring, supporting, watertightening and other necessary repair works were carried out to the gateway.

181. DEVIDOL, JOYSAGAR, DISTRICT SIBSAGAR.—The entire floor was repaired. The missing brick works were reproduced. The top was watertightened. Besides, brick apron was also provided around the temple.

182. KHARENGGHAR OF THE AHOM KINGS, JOYSAGAR, DISTRICT SIBSAGAR.—Missing brick work of the cornices, door arches were reproduced and intrados of the dome of the temple, wherever necessary, were" plastered. The roof terrace and entire platform of the temple was grouted.

The walls of the underground cells were plastered and arches, niches and ornamental plaster were reproduced. The ceiling as well as the floor was also repaired.

The western side walls towards the tank were also pointed. The cracks developed on the ceiling of the casualty ward were grouted and the arches repaired. The arch doors at the ground floor were also provided with iron gate.

183. RANGHAR PAVILION, JOYSAGAR, DISTRICT SIBSAGAR.—The roof-top was watertightened. The eastern wall of the first floor was pointed. The cornices were repaired. The ornamental works were reproduced. The arches were plastered wherever necessary. The fish scale designs on the ceiling of the first floor and the *makaras* on both the side walls of the ground floor. The corridor of the ground floor was plastered with necessary pointing, etc.

Manipur

184. TEMPLE OF VISHNU, BISHENPUR, DISTRICT IMPHAL.—The cracks developed on the top of the main temple and the *mukha-mandapa* were filled up after uprooting the tree-roots, setting and resetting of bricks. The apron around the temple was repaired.

Tripura

185. SCULPTURES AND ROCK-CUT RELIEF, DISTRICT NORTH TRIPURA.—Grouting and filling up of cracks developed on all rock-cut sculptures were done. Steps were provided to the Ganesa panel and Trimurti.

186. THAKURANI TILLA, PASCHIM PILAK, DISTRICT SOUTH TRIPURA.—The work of fencing and providing cattle-proof gate was completed.

187. GUNAVATI GROUP OF TEMPLES, UDAIPUR, DISTRICT SOUTH TRIPURA.—Restoration of corner pillars/minarets, underpinning, pointing, plastering, repairing of dome and *amalakas* and other necessary repair works including grill fencing were attended to and completed.

188. TEMPLES OF CHATURDASADEVATA, UDAIPUR, DISTRICT SOUTH TRIPURA.—The work of restoration of compound wall, underpinning and pointing, wherever necessary, and other repair works of the wall were attended to and completed.

HYDERABAD CIRCLE

Andhra Pradesh

189. CHENNEKESVASWAMI TEMPLE, CHANDRAGIRI, DISTRICT CHITTOOR.—The bulged and out-of-plumb granite stone wall around the *garbha-griha* was removed and reset. The dilapidated *gopura* was watertightened after underpinning the brickwork. The roof of the *maha-mandapa* was watertightened by laying lime concrete with two layers of flat-tiles.

190. RAJA MAHAL, CHANDRAGIRI, DISTRICT CHITTOOR.—The missing corbel stones, c*hhajjas* and balconies on the frontage of the Raja Mahar were restored. Watertightening the roof was also attended to.

191. SOUMYANATHA TEMPLE, NANDALUR, DISTRICT CUDDAPAH.—The weathering effected brick components of the entrance *gopura* were replastered and watertightened after underpinning. The stucco work was also restored.

The decayed, weather proof course over the *mandapa,* the damaged parapet walls, roof slabs, capitals, beams, etc. of the main shrine were dismantled and repaired.

192. SRI KODANDARAMASVAMI TEMPLE, VONTIMITTA, DISTRICT CUDDAPAH.—The dilapidated southern *gopura* was restored in tune with earlier pattern and the stucco with *kudu* arches, pilasters, *simhalalatas,* etc., were restored as per the original.

193. BHIMESVARAM TEMPLE, SAMALKOT BHIMASVARAM, DISTRICT EAST GODAVARI.—The damaged flooring of brick jelly of the outer cloister was removed and relaid with fresh material matching the original. The terraces of all the shrines in the outer cloister had developed cracks and leaks. The old and damaged brick jelly lime concrete was therefore removed and relaid with fresh material matching the original, covering the roof by two course of flat-tiles for better preservation.

194. KUDAVALLI SANGAMESVARA TEMPLE, ALAMPUR, DISTRICT MAHBUBNAGAR.—With the carefully disassambled transported temple components from the original site, the reconstruction work of the Kudavalli Sangamesvara temple is in progress at a higher safer site. The reconstruction of the *sikhara* has come upto its *sikhara* base stone.

195. MUKHALINGESVARA TEMPLE, SRIMUKHALINGAM, DISTRICT SRIKAKULAM.—The old and decayed lime plaster over the *sikhara* and sculptures was removed and the damaged parts repaired and reset. The stone flooring in the courtyard was removed and relaid, giving it a proper slope.

196. THOUSAND PILLARED TEMPLE, HANAMKONDA, DISTRICT WARANGAL.—Due to the weak foundation, the *adhishthana* was sunken. The north-west corner of the same was dismantled and restored by providing a strong concrete foundation.

197. RAMAPPA TEMPLE, PALAMPET, DISTRICT WARANGAL.—The dislodged and sunken *Nandi-mandapa* was disassembled carefully for reconstruction at its original orientation, after documenting the *mandapa* components numerically and photographed after preparing the detailed drawings from all angles.

198. WARANGAL FORT, WARANGAL, DISTRICT WARANGAL.—As the *kirti-torana* was resting on weak and shallow sand box foundation, a screen wall, rectangular in plan, of concrete was made around the southern *torana* to a depth of 2-3 m below the ground level to prevent sub-soil water from causing any further decay and covered with a 15 cm thick layer of concrete and a 30 cm thick layer of gravel-mud mix for laying a grass lawn.

JAIPUR CIRCLE

Rajasthan

199. FORT, BHARATPUR, DISTRICT BHARATPUR.—The repairs to the fortification wall were carried out by way of eradication of rank vegetation and jungle growth, pointing of the deep and wide masonry joints and underpinning the voids and hollows. Restoration of the fallen and missing portions of the fort wall is in progress. The eroded portions of the earthern mound of the Jawahar Burz were filled up with fresh clay and consolidated.

200. SURAJ BHAWAN, DEEG, DISTRICT BHARATPUR.—Wooden doors and windows were restored.

201. FORT, CHITTAURGARH, DISTRICT CHITTAURGARH.—Special repairs to Rana Kumbha palace, shops of Moti Bazar and Nagina Bazar and reconstruction of the fallen fortification wall near Ram Pole was taken up. The work is in progress.

202. FORT, JAISALMER, DISTRICT JAISALMER.—Dismantling and reconstruction of the bulged out and damaged portions of the lower fortification wall is in progress.

203. BUDDHIST CAVES, KOLVI, DISTRICT JHALAWAR.—Filling up of wide cracks and gaps with R.R. masonry in Cave 7 to 10 was done. The work of providing support to the remaining portion of the roof in Cave 15 is in progress.

204. ANCIENT RUINS AND STRUCTURAL REMAINS, KRISHNAVILAS, DISTRICT KOTAH.—The work of clearance of debris from the temple is in progress. Various architectural members were sorted out for proper restoration of this edifice.

205. FORT, RANTHAMBHOR, DISTRICT SAWAI MADHOPUR.—The work of providing concealed steel girders in the broken stone beams and finishing the outer surface of the Hamir palace is in progress.

LUCKNOW CIRCLE

Uttar Pradesh

206. KHUSRO BAGH GATE, ALLAHABAD, DISTRICT ALLAHABAD.—The dead and old plaster from the eastern and western side walls of the gate were removed and replastered. *Kanguras* and arches on north-east side were also plastered.

207. CEMETERIES IN KYDGANJ, ALLAHABAD, DISTRICT ALLAHABAD.—The missing compound wall towards west and south sides of the cemetery was restored and 1.51 m high iron railing was provided.

208. EXCAVATED SITE, SRINGAVERAPURA, DISTRICT ALLAHABAD.—Restoration work of the Tank-B was taken up and loose bricks on the top layers were taken out and reset in position and open joints were pointed.

209. STUPAS AND MONASTERY, PIPRAHWA, DISTRICT BASTI.—The work of resetting of ancient bricks in position and pointing the open joints is in progress.

210. GULAB BARI, FAIZABAD, DISTRICT FAIZABAD.—The old plaster of the outer western façade of the gate was removed and replastered. The old plaster of the walls, having rich moulding work was also changed as per requirement.

211. TOMB OF BAHU BEGUM, FAIZABAD, DISTRICT FAIZABAD.—The walls of ground floor, cells and outer facade were replastered.

212. AURANGZEB'S PAVILION, KHAJUHA, DISTRICT FATEHPUR.—Interior of the eastern side gate was plastered after underpinning the cavities. Side walls of the platform and western pavilion were plastered. North-eastern side of the east facing walls of eastern pavilion was underpinned with *lakhauri* bricks. Near eastern side pavilion, a collapsible iron gate was provided.

213. LAKE OF KIRAT SAGAR, DISTRICT HAMIRPUR.—The work of underpinning with rubble stones and pointing the open joints of Alha-ki-Baithak was completed.

214. JHANSI FORT, JHANSI, DISTRICT JHANSI.—The southern side of flagstaff bastion alongwith the road between the fort and the city and the south eastern side, towards the temple of the appurtenant land was fenced with barbed wire.

The road between the second gate of Jhansi fort and the Siva temple was consolidated by rubble stone pitching. The rubble stone wall near Baradari was underpinned and pointed. The verandah of the first floor of the Flagstaff bastion was made compact and its roof terrace was strengthened by lime concreting.

215. KATCHERY CEMETERY, KANPUR, DISTRICT KANPUR.—The height of the compound wall of the cemetery was raised and both sides of the western compound wall and the outer side of the southern wall were plastered. Angle iron post was fixed on the compound wall for fencing. Few graves situated in the eastern portion of the monument were underpinned and replastered.

216. IMAMBARA OF ASAF-UD-DAULA, LUCKNOW, DISTRICT LUCKNOW.—The east facing inner facade of gateway of *baoli* situated in the Imambara complex, was restored as per the original, after underpinning with *lakhauri* bricks in lime mortar. The richly moulded and ornamental plaster of the three passages of the second gateway and painting of the outer inner gates was done. The richly moulded, carved and ornamental on the north-east side of the Imambara was attended to.

217. ASAFI MOSQUE, LUCKNOW, DISTRICT LUCKNOW.—The octagonal *burji* alongwith the three adjoining big rooms of Asafi mosque were repaired by attending to their deteriorating moulded, carved and ornamental work on walls, ceiling, piers, arches and outer facades, upto parapet wall.

218. NADAN MAHAL, LUCKNOW, DISTRICT LUCKNOW.—The brick pavement was provided around the wicket gate and from there to the entrance of the mosque, brick-paved pathway was provided between the iron-gate (main entrance gate) and Solah-Khamba. Plinth protection, in lime and cement concrete, was given to the areas skirting the white tomb including Solah-Khamba and Ibrahim Chishti's tomb.

219. RESIDENCY BUILDING COMPLEX, LUCKNOW, DISTRICT LUCKNOW.—The breach in the eastern boundary wall of the complex was filled and 12 mm thick plaster was given over it. The dilapidated portion was strengthened by providing seven additional brick pillars. The Badhatey-kadam and its stairs were given colour/white wash and wooden doors and windows were repainted.

The repairs in the ground floor of the Model room by way of underpinning, recessed pointing and edging of broken plaster on the exterior of the building were completed. Old and decayed plaster of the interior was replaced by matching new plaster. The interior wall surface was treated with oil bound distemper. The pulverized lime concrete of the roof-terrace was replaced by fresh lime concrete terrace. The decayed wooden doors and door-jambs were replaced by new ones by giving over them a coat of matching paint. The frame of the Model was repainted with super quality enamel paint.

220. SHAH NAZAF'S TOMB, LUCKNOW, DISTRICT LUCKNOW.—The process of applying the 3 cm to 5 cm thick simple moulded plaster on the exterior and 3 cm to 5 cm thick highly moulded plaster over the interior wall surface of the main *rauza* was completed. The roof terrace of the main *rauza* and verandah were provided with lime concrete. The cracks in the large and main dome of Shah Nazaf are being filled by grouting method. The work is in progress.

221. RUMI DARWAZA, LUCKNOW, DISTRICT LUCKNOW.—The first and second floor of the northern wing facing east towards Rumi Darwaza and parapet wall of miniature domes were repaired by underpinning and by retouching the moulded and plain lime cement plaster.

MADRAS CIRCLE

Kerala

222. FORT ST. ANJELO, CANNANORE, DISTRICT CANNANORE.—The top of the fort wall was watertightened with cement concrete.

223. FORT, TELLICHERRY, DISTRICT CANNANORE.—The decayed laterite stones alongwith the tree roots over the fort wall were removed and filled with laterite stone masonry with suitable colouring to match with the original.

224. FORT, PALGHAT, DISTRICT PALGHAT.—The old and dead lime mortar over the granite masonry was raked out and flush pointed in combination mortar with suitable colour to match with the original. The damaged random rubble masonry in lime mortar was dismantled and fresh masonry in combination mortar was provided. Earth work was done inside the fort for levelling the ground and to divert the rain water.

225. SIVA TEMPLE, PERUVANAM, DISTRICT TRICHUR.—The decayed wooden members of the roof of the Chuttambalam southern side (outer *prakara)* were removed and replaced with new teak wood as per the original (pl. LXXVI). The wooden members were painted with wood preservatives after removing moss and lichen. The damaged and dead plaster over the walls of the Chuttambalam was removed and replastered with combination mortar.

Pondicherry

226. MOOLANATHASVAMI TEMPLE, BAHUR.—The original plinth mouldings were exposed and the outer *prakara* was provided with stone flooring.

227. PANCHANADISVARA TEMPLE, THIRUVANDARKOIL.—The out-of-plumb stone wall was completely dismantled and reconstructed as per the original and the leaky terrace was dismantled. The old thick lime wash wherever found was removed.

Tamil Nadu

228. KAILASANATHA TEMPLE, KANCHIPURAM, DISTRICT CHENGAI-ANNA.—The outlets in the cloistered *mandapa* were cleared and pointed with cement mortar to facilitate easy flow of water.

229. MUKUNDANAYANAR TEMPLE, MAMALLAPURAM, DISTRICT CHENGAI-ANNA.—The monument was provided with chain link fencing.

230. SHORE TEMPLE, MAMALLAPURAM, DISTRICT CHENGAI-ANNA.—The work of providing chain link fencing and painting the same was completed.

231. DUTCH CEMETERY, PULICAT, DISTRICT CHENGAI-ANNA.—The dislodged stone arched entrance was reset and the damaged plaster was removed and replastered.

232. TIRUPULESWARAR TEMPLE, VAYALUR, DISTRICT CHENGAI-ANNA.—The work of dismantling structure No. 3 was completed and reconstruction of the same was taken up.

233. FORT MUSEUM, MADRAS, DISTRICT MADRAS.—The leaky Mangalore tiled roof over the laboratory section of the Chemical Branch was repaired after replacing the broken tiles with new ones. The wooden members were given a fresh coat of paint.

234. CLIVE'S BUILDING, MADRAS, DISTRICT MADRAS.—The leaky terrace on the northern wing of the building was dismantled and relaid after replacing the decayed wooden beams with new ones. The damaged/dead plaster over the walls was removed and replastered. The damaged flooring was relaid.

235. TOMB OF DAVID YALE AND JOSEPH HYMNER, MADRAS, DISTRICT MADRAS.—A brick retaining wall was constructed on the south, east and western sides to check the inflow of rain water and the monument was provided with concealed drainage to drain out rain water.

236. SOMANATHASVAMI TEMPLE, MELAPADI, DISTRICT NORTH ARCOT.—The out of plumb walls of *mandapalli* and *yagasala* were dismantled and reset. Their leaky roofs were watertightened in brick jelly concrete and tiles to match with the original were laid down. In addition, the *yagasala* was provided with brick coping and stone flooring.

237. ROCK-CUT TEMPLE AND SCULPTURES, SIYAMANGALAM, DISTRICT NORTH ARCOT.—The *sikhara* over the main shrine was watertightened with specially prepared mortar after restoring the broken portions. The missing lintels of the openings were provided with expanded metal fittings to prevent entry of bats.

238. FORT, VELLORE, DISTRICT NORTH ARCOT.—The work of providing grill fencing over the stone wall on the northern wing of the eastern side of the fort was taken up and a total length of

95 m fencing was provided. All the cells (numbering eighty-three) inside the rampart between the inner and outer fort wall were provided with proper flooring in stone jelly concrete and were provided with iron grill gates.

239. JALAKANTHESVARA TEMPLE, VELLORE, DISTRICT NORTH ARCOT.—The work of refixing the beams, pillars and capitals was taken up and the ceiling slabs over the northern and southern sides of the middle bay were fixed as per the original. The work of preparing a new beam for the western side is in progress. Flag stone pavement between the first and second *gopuras* was completed as per the original. Stone flooring was provided on the southern and eastern sides of the *kalyanamandapa.*

240. SUGRISVARA TEMPLE, SIRCARPERIYAPALAYAM, DISTRICT PERIYAR.—The dilapidated southern wall of the Amman Shrine was reconstructed as per the original after providing fresh core between the veneer stones and by using copper dowel at intervals. The leaky terrace of the *mahamandapa* was watertightened.

241. SUNDARACHOLISVARA TEMPLE (SIVA TEMPLE), KULATHUR, DISTRICT PUDUKKCTTAI.------The work of reconstructing the entire temple including the Amman Shrine, which was in progress during 1987-88, was completed as per the original (pl. LXXVII).

242. THIRUPPERUMANDAN TEMPLE (MADATHUKOIL), NANGUPATTI, DISTRICT PUDUKKOTTAI.—The reconstruction of the *mandapalli* (kitchen), the inner cloistered *prakara* wall and the inner entrance *mandapa* on the west were completed as per the original.

243. FORT WITH BUILDINGS, ATTUR, DISTRICT SALEM.—The work of reconstructing the bastions on the western side is in progress.

244. NARASIMHASVAMI TEMPLE, NAMAKKAL, DISTRICT SALEM.—The south-eastern corner of the main shrine floor and a part of the Amman shrine floor were paved with new stones.

245. MURUGANATHASVAMI TEMPLE, THIRUMURUGANPOONDI, DISTRICT SALEM.—The eastern *thirumadil* (enclosure wall) was reconstructed after providing a suitable foundation in cement concrete, random rubble masonry by using old available veneer stones and new stones wherever necessary. The top portion of the *thirumadil* was finally provided with brick coping.

246. FORT COMPLEX AND TEMPLES, GINGEE, DISTRICT SOUTH ARCOT.—Old and decayed plaster from the walls of the Kalyanamahal complex, central tank, eastern and southern cloistered *mandapa* etc., were carefully raked out and replastered in combination mortar and finally provided with a finishing layer by specially hand grind lime and mortar.

247. AIRAVATESVARA TEMPLE, DARASURAM, DISTRICT THANJAVUR.—The weathered coping over the *thirumadil (prakara* wall) was raked out and replastered in combination mortar. The wide gaps in the stone joints of the *thirumadil* were pointed and filetted in combination mortar.

248. BRIHADISVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR.—The undulated and broken stone flooring in the *mandapalli* (kitchen) was removed and reset over a cement concrete bed.

249. BRIHADISVARA TEMPLE, GANGAIKONDACHOLAPURAM, DISTRICT THIRUCHI.—The fallen stone base of the well *{Simha keni)* inside the temple enclosure was reconstructed as per the original by using the old available stone, after filling the core with bricks.

MINI CIRCLE, GOA

Goa

250. AUGUADA FORT, AUGUADA, DISTRICT NORTH GOA.—The fallen portion of the northern fortification wall of the lower fort was reconstructed as per the original. Regular openings were provided to drain out the accumulated water. Wherever necessary, recess pointing and watertightening was done. The entire fortification wall was made free from the thick growth of vegetation.

251. THE BASILICA OF BOM JESUS, GOA, DISTRICT NORTH GOA.—In continuation of the previous year's work, the compound wall on the western and south-western periphery of the Basilica was reconstructed as per the original. A wide entrance gate was provided to the western side for easy movement.

The worn out stones of the facade of the Basilica was replaced by new ones.

252. SAFA MASJID, PONDA, DISTRICT NORTH GOA.—The laterite stone passage, on the periphery of the water cistern of this monument was relaid. The fallen arches were restored as per the original.

253. MAHADEVA TEMPLE, KHURDI, DISTRICT SOUTH GOA.—After recording the detailed information about the temple and numbering each stone piece carefully, this tenth century monument was dismantled. The dismantled numbers were transported carefully to a new site near Salaulim Dam site. The reconstruction as per the original plan of elevation at the new site was started. One basement, out of the two original ones, was reconstructed.

MINI CIRCLE, SHIMLA

Himachal Pradesh

254. NARASIMHA TEMPLE, BHARMOUR, DISTRICT CHAMBA.—The missing, sunken and dislodged slate stone flooring of the compound of the temple was dismantled and reset over a concrete base ' after levelling the area. The bulged out retaining walls on the east and south side were reset as per the original.

255. CHAMUNDA DEVI TEMPLE, CHAMBA, DISTRICT CHAMBA.—In continuation of previous year's work, the fallen out retaining walls on the south side were reconstructed and pointed. The courtyard

of the temple on east and south side was provided with slatestone flooring over concrete base. The work of pointing the parapet and compound wall wherever necessary was attended to and completed.

256. LAKSHMI-NARAYANA GROUP OF TEMPLES IN MOHALLA HATTNALA, DISTRICT CHAMBA.—The work of providing stone slab flooring over concrete base around the temple complex was taken up and is in progress. The leaking roof of the *mandapa* of the Lakshmi-Narayana temple was watertightened.

257. SAKTI DEVI TEMPLE, CHHATRARI, DISTRICT CHAMBA.—The old outlet drain around the temple was restored. The sunken slab of the floor of the courtyard of the temple was attended to by resetting over concrete base. The decayed wooden planks of roof top wherever necessary were replaced with new ones.

258. SITA-RAMA TEMPLE IN MOHALLA BANGOTA, DISTRICT CHAMBA.—In continuation of previous year's work *(1987-88,* p. 207), M.S. gate and grill around the temple over dwarf wall were fixed.

259. NARBADESVARA TEMPLE, SUJANPUR, DISTRICT HAMIRPUR.—The leaking roof of the temple was watertightened by providing fresh *lime-surkhi* concrete as per original after carefully raking out the pulverized one and stitching the cracks. The rooms on either side of the main gate were provided with concrete flooring to stop dampness. The decayed wooden frames and shutters of the windows and doors were replaced with new ones as per original.

260. KATOCH PALACE, TIRA SUJANPUR, DISTRICT HAMIRPUR.—The damaged top roof terrace of the structures on either side of main gateway was concreted and watertightened after removing and taking out the pulverized ones. The approach steps, leading to the main gate from road side, were also provided.

261. TEMPLE OF BAUNATH, BAUNATH, DISTRICT KANGRA.—During the year under review, the work of providing walls on two sides of the tank was taken up and completed.

262. LORD ELGIN'S TOMB, DHARAMSHALA, DISTRICT KANGRA.—The sunken and bulged out portions of the platform of the tomb was dismantled carefully and reset as per original.

263. RUINED FORT, KANGRA, DISTRICT KANGRA.—TWO fallen buttress walls between Ranjit Singh gate and Jahangiri gate were reconstructed. The process of conserving the fallen retaining wall, between Andheri gate and Jahangiri gate, is in progress. The pulverized concrete floor of the cells in front of temples, was removed and concreted as per original. Process of providing flag stone flooring of courtyard in front of the Lakshmi Narayana temple is in progress.

264. ROCK-CUT TEMPLES, MASRUR, DISTRICT KANGRA.—In continuation of previous year's work *(1987-88,* p. 202), fallen patches of stone masonry walls of the tank were reset by underpinning and pointing the joints and strengthening the foundations after dewatering the tank.

265. TEMPLE OF BASHESHAR MAHADEO, BAJAURA, DISTRICT KULLU.—In order to stop seepage of rain water, the *sikhara* of the temple was watertightened.

266. HIDIMBA DEVI TEMPLE, MANALI, DISTRICT KULLU.—The work of replacing the decayed wooden shingles of the second tier of the roof of the temple is in progress.

267. TEMPLE OF GAURI-SHANKAR, NAGAR, DISTRICT KULLU.—The work of providing parapet wall over platform and breast wall on north side is in progress.

268. BUDDHIST MONASTERIES, TABO, DISTRICT LAHAUL AND SPITI.—In continuation of previous year's *(1987-88,* p. 22) work, the roof was watertightened after replacing the decayed wooden members of the main roof of Duwang Gumpha. The flooring of Zelma Gumpha was concreted to check dampness. The floor of the courtyard in front of the Zelma Gumpha was also concreted. In order to avoid misuse of monastic complex, wooden door was fixed to the main gate. The pathway was relaid. The most dilapidated and damaged *chortens* within the complex were repaired as per original.

269. PANCHAVAKTRA AND BATUKA BHAIRAVA TEMPLES, MANDI, DISTRICT MANDI.—The work of dismantling the out-of-plumb, bulged out and cracked *sikhara* of the Batuka Bhairava temple and providing flooring on concrete base in between the two temples was taken up. The work is in progress.

270. TRILOKINATHA TEMPLE, MANDI, DISTRICT MANDI.—Reconstruction of the left out portion of retaining wall on road side was taken up and completed. The dismantling and resetting of the out-of-plumb, bulged out and dislodged miniature temples are in progress. In order to stop dampness, the drains at the back side of the office were concreted. M.S. gate was fixed to stop misuse of the temple premises.

PATNA CIRCLE

Bihar

271. GOLGHAR OR GOLA, PATNA, DISTRICT PATNA.—Periodical repairs and restoration work was undertaken and completed.

272. RELIC STUPA, VAISHALI, DISTRICT VAISHALI.—A domical shaped shed was provided over the ancient relic-stupa.

273. RAJA VISHAL KA-GARH, VAISHALI, DISTRICT VAISHALI.—The dislodged bricks were reset and the cavities were filled by recess pointing method.

Uttar Pradesh

274. CHAUKHANDI STUPA, SARNATH, DISTRICT VARANASI.—The debris around the stupa was cleared. Scientific clearance, watertightening, underpinning of surface of the stupa were also done.

275. DHARAHRA MOSQUE, VARANASI, DISTRICT VARANASI.—Pointing of stone was completed. Lime tempering and pointing, wherever necessary, was also attended to.

SRINAGAR CIRCLE

Jammu and Kashmir

276. MARTAND TEMPLE, RANBIRPURA, DISTRICT ANANTNAG.—The accumulated earth and dislodged stones around the temple were removed and peristyle wall was repaired after core-filling with the available stones. Dilapidated miniature shrine on the eastern side was taken up for repairs and on all missing portions were fixed in their *in situ* position.

277. MUGHAL ARCADE, VERINAG, DISTRICT ANANTNAG.—After completing the masonry work and lime concreting the roof of the arcade, the dislodged and broken lintels were taken up for repairs.

278. KHANPUR SARAI, KHANPUR, DISTRICT BADGAM.—The dilapidated Khanpur Sarai, a Mughal monument was surveyed and the encroachments and accumulated earth around the monument were removed.

279. STUPA, PARIHASPURA, DEVAR, DISTRICT BARAMULA.—In continuation of previous year's *(1987-88,* p. 203) work the upper portion of southern steps of stupa was cleared off the accumulated debris. By filling up the cavity with rubble stones the upper steps were restored to its original shape. The huge side walls of the upper steps were also restored. The work is in progress.

280. RAJVIHARA, PARIHASPURA, DEVAR, DISTRICT BARAMULA.—In continuation of the previous year's *(1987-88,* p. 203) work the remaining work on the eastern side was taken up. The north-eastern side of the monastery had developed leaning due to water seepage and much of its stones were dislodged from their original position. The north-eastern side of the monastery wall was taken down stone by stone and restored as per the original.

281. CHAITYA, PARIHASPURA, DEVAR, DISTRICT BARAMULA.—The fallen architectural members of the eastern entrance were removed and stacked. After removing accumulated earth, the repairs to the step portions were accomplished with the help of the available old stones. The work is in progress.

282. AKHNOOR FORT, AKHNOOR, DISTRICT JAMMU.—TO retain the structure in its proper position the buttresses of the bastions were repaired after providing a solid foundation (pl. LXXVIII). The work is in progress.

283. ANCIENT TEMPLE, BILLAWAR, DISTRICT KATHUA.—To protect the foundation of temple from the seepage of water into the foundation regular apron around the temple was provided as per the original traces. To stop the leakage of water the *sikhara* portion was also grouted.

284. STUPA AT TISSERU, LEH, DISTRICT LEH.—In continuation of the previous year's *(1987-88,* p. 203) work the repairs to the lower and upper terraces on the western side were carried out. The passage was repaired by way of providing new wooden twigs. The work is in progress.

285. AVANTISVAMI TEMPLE, AWANTIPUR, DISTRICT PULWAMA.—In continuation of the previous year's *(1987-88,* p. 203) work, the work was resumed on the eastern side. The weathered and damaged portion of the temple plinth was dismantled and reset with the available old stones. The work is in progress.

286. AVANTISVARA TEMPLE, AWANTIPUR, DISTRICT PULWAMA.—The damaged and missing portion of the temple basement and its steps on the southern side was taken up for repairs. The damaged and dislodged stones were pulled down and accumulated debris was cleared. The side walls of the steps were restored with the available stones, the steps were repaired with the new stones (pl. LXXIX). A drain was constructed towards the road end for diverting the rain water from the temple complex.

287. SIVA TEMPLE, PAYAR, DISTRICT PULWAMA.—To keep temple away from encroachments and natural hazards, a compound wall with a gateway was provided. A stone pathway was laid for easy access.

288. PATHAR MASJID, SRINAGAR, DISTRICT SRINAGAR.—To check water seepage the roof was watertightened. The modern bricks used in the wall, during some repairs were replaced by the *lakhauri* bricks to match the same with the original.

289. AKHUN MULLA SHAH MOSQUE, SRINAGAR, DISTRICT SRINAGAR.—With the passage of time, lot of earth had accumulated over the domical roof of the mosque and to save it from further damage the accumulated debris and the dead lime concrete over the roof were removed and fresh lime concrete was laid to check the seepage of water. Besides roofs of the cells of *madrasa* were watertightened by lime concreting. Wherever necessary, doors and windows were also provided.

290. BUDDHIST SITE, HARWAN, DISTRICT SRINAGAR.—To protect the Buddhist remains at Harwan from animal menace and human vandalism, a chain link and barbed wire fencing were provided over the dwarf wall.

291. SHANKARACHARYA TEMPLE, SRINAGAR, DISTRICT SRINAGAR.—The modern brick parapet wall was replaced with fine chisel dressed and moulded stones as per the original.

292. NARANAG GROUP OF TEMPLES, WANGATH, DISTRICT SRINAGAR.—In continuation of the previous year's *(1987-88,* p. 204) work, the reconstruction of the retaining wall was completed in

the first group of temples. The repairs to the gateway were also undertaken. In the second group, the dilapidated miniature temples were dismantled stone by stone and re-erected after providing solid base concrete and all the weathered and broken stones were replaced with the stones available at the site as per the original. The work is in progress.

293. GROUP OF TEMPLES, KIRAMCHI, DISTRICT UDHAMPUR.—In continuation of the previous year's *(1987-88,* p. 204) work, the southern portion of the temple 4 was dismantled and reset as per the original. All weathered and broken beams and moulded stones were replaced by new ones (pl. LXXX). The *sikhara* portion was erected up to the neck portion. The work is in progress.

294. GROUP OF ANCIENT TEMPLES, BABOUR, DISTRICT UDHAMPUR.—In continuation of previous year's *(1987-88,* p. 204) work, at Dera temple, the repairs to the front wall of *mandapa* of the temple was continued as per the original traces. The work is in progress.

To stop the erosion of soil and to divert the flow of water, a dry pitch masonry retaining wall was constructed around Kala Dera I temple. The area around the temple was made even to provide easy flow of the rain water away from the temple.

Partly missing *mandapa* wall of the Kala Dera II temple was restored with new stones.

295. PALACE ATTRIBUTED TO RAJA SUCHET SINGH, RAMNAGAR, DISTRICT UDHAMPUR.—To save the painted walls of the Sheesh Mahal from seepage, the accumulated earth and dead lime concrete over the roof terrace were removed and fresh tile flooring was laid over the lime concrete. The buttresses of the palace were also strengthened for the safety of the structure.

The western chambers and the rooms on the first floor on the north-east side of the Nawa Mahal were repaired. Long north-eastern and southern portions of the walls were also repaired as per the original. Roof was also provided over the rooms on the western side.

Repairs were also taken up to the eastern and southern fortification wall of the Purana Mahal in stone and brick which had developed wide cracks and had also fallen down at several places. The work is in progress.

VADODARA CIRCLE

Daman and Diu

296. FORT WALL, MOTI DAMAN.—The brick masonry wall near the House of Bocaise was cleared of vegetation. The cavities of the wall were filled up with similar material, some of the portions of the wall were reconstructed and the remaining portions were underpinned after removing tree roots etc. with special size bricks in lime cement mortar. The wall has been watertightened.

297. RUINED CHURCH NEAR N.W. CORNER AT MOTI DAMAN.—Debris clearance had revealed a portion of hidden church wall, parts of which was badly affected by salt laden winds. The same was

underpinned matching the original. The missing ashlar and cut stone masonry was reconstructed on the original pattern using similar stones.

Gujarat

298. AZAM MUAZZAM RAUZA, AHMEDABAD, DISTRICT AHMEDABAD.—The dead and spongy plaster of the walls was dislodged carefully and after raking the joints, fresh layer of lime cement plaster was provided.

299. DADA HARIR'S MOSQUE, AHMEDABAD, DISTRICT AHMEDABAD.—The badly damaged stone *jalis, chhajjas, kakshasana* stones, merlons, etc. were reconstructed with new stones carved in the original pattern (pls. LXXXI-LXXXII).

300. MALAV TANK, DHOLKA, DISTRICT AHMEDABAD.—To prevent any encroachments and for developing garden, the area around the tank was wire fenced. The Rudrakupa and inlet channel of the tank was desilted.

301. DOCKYARD, LOTHAL, DISTRICT AHMEDABAD.—Out-of-plumb brick masonry walls of the Dockyard were dismantled and reconstructed with new, "special types of bricks manufactured for the purpose.

302. GREAT TANK, PALACE AND HAREM, SARKHEJ, DISTRICT AHMEDABAD.—The tilted and out-of-plumb ashlar masonry walls, capitals, pillars and slabs were carefully dismantled and reconstructed by replacing the worn-out stones with new stones duly dressed as per original (pl. LXXXIII). The dead lime concrete of the roof was removed and replaced by new layer of lime cement concrete to make the roof watertight. The missing Dara and diamond course layers were reconstructed as per original moulding and carvings.

303. MUNSOR TALAV AT VIRAMGAM, DISTRICT AHMEDABAD.—The bulged and sunken ashlar masonry of small shrines and steps was carefully dismantled and reconstructed. New stones were provided in place of the missing and worn-out stones as per original pattern.

304. DWARKADHISH GROUP OF TEMPLE, DWARKA, DISTRICT JAMNAGAR.—In continuation of the previous year's *(1987-88,* p. 206) work, new lintels, pillars, capitals and roof slabs were provided in place of worn-out and broken members.

The decayed and worn-out southern and eastern sides of *sikhara* and other portions of the Pradyumnaji temple were carefully dismantled and reconstructed with new members, carved as per original pattern.

The decayed and worn-out *sikhara* upto the *chhajja* portion of the Purushotamji temple was dismantled and reconstructed by replacing worn-out and decayed stones with new ones after dressing and carving as per original.

305. SUN TEMPLE, MODHERA, DISTRICT MEHSANA.—The missing ashlar stone masonry, *chhajja,* capital, lintels, etc. were provided with new ones with original carvings and mouldings.

306. MALAI MATA TEMPLE, PALODAR, DISTRICT MEHSANA.—The brick masonry ramp on northern side, constructed prior to declaration of monument as centrally protected, was removed completely. The foundation was exposed and after laying fresh concrete, entire wall was reconstructed with new ashlar stone masonry following original mouldings and pattern after providing brick hearting masonry The work is in progress.

307. RANI-KI-VAV, PATAN, DISTRICT MEHSANA.—Missing ashlar stone masonry of walls has been reconstructed as per original pattern. Portion of Vav was desilted and debris removed. The work is in progress.

308. BAWA MAN'S MOSQUE, PAVAGADH, DISTRICT PANCHMAHALS.—The accumulated debris was removed and out-of-plumb ashlar stone masonry was dismantled and reconstructed.

309. EK MINAR-KI-MASJID, PAVAGADH, DISTRICT PANCHMAHALS.—The missing concrete floor was restored.

310. KEVADA MASJID, PAVAGADH, DISTRICT PANCHMAHALS.—The missing ashlar stone masonry was provided in original pattern.

311. PALACE OF PATAI RAVAL, PAVAGADH, DISTRICT PANCHMAHALS.—The missing rubble masonry wall was reconstructed and the roof made watertight.

312. WALLS OF FORT ON TOP, PAVAGADH, DISTRICT PANCHMAHALS.—The out-of-plumb and bulged ashlar stone masonry and random rubble masonry was dismantled and reconstructed.

313. NAVLAKHA TEMPLE AT SEJAKPUR, DISTRICT SURENDRANAGAR.—Prior to the dismantling of the temple, random rubble masonry support was given to the broken lintels and capitals of *sabha-mandapa* to prevent collapse of the *mandapa.* New stones to replace the old and broken ones were dressed as per original pattern. First three courses of plinth masonry were replaced with newly dressed stones.

314. NANDODI GATE, DABHOI, DISTRICT VADODARA.—Brick masonry compound wall was constructed and iron grills were fixed therein.

MONUMENTS MAINTAINED BY THE STATES

ANDHRA PRADESH

The Department of Archaeology and Museums, Andhra Pradesh, carried out conservation works at the following monuments:

1. OLD DISTRICT MUSEUM BUILDING At GUNTUR, DISTRICT GUNTUR.
2. HAYAT BAKSHI BEGUM MOSQUE, GOLCONDA, DISTRICT HYDERABAD.
3. GAJASALA AT KONDAPALLI FORT, DISTRICT KRISHNA.
4. GANGAPUR TEMPLE AT MAHBUBNAGAR, DISTRICT MAHBUBNAGAR.
5. KAKATIYAN TEMPLE AT NIDIKONDA, DISTRICT WARANGAL.
6. CIRCULAR CHAITYA AT BAVIKONDA, DISTRICT VIZAG.

GUJARAT

The Department of Archaeology, Gujarat, carried out conservation works at following monuments:

7. AMRUT VARSHINI VAV, AHMEDABAD, DISTRICT AHMEDABAD.
8. VISHNU TEMPLE, ODADAR, DISTRICT JUNAGADH.
9. ADI-CHADI VAV, UPERKOT, DISTRICT JUNAGADH.
10. NILAM TOP (CANON), UPERKOT, DISTRICT JUNAGADH.
11. VADIMEDI, MANJAL, DISTRICT KUTCH.
12. MANVA MAMA TEMPLE, BEDADRA, DISTRICT SURENDRANAGAR.
13. MUNI BABA TEMPLE, THAN, DISTRICT SURENDRANAGAR.

KARNATAKA

The Department of Archaeology and Museums, Karnataka, carried out conservation works at the following monuments:

14. KITTUR RANI CHENNAMMA PALACE, KITTUR, DISTRICT BELGAUM.—Construction of stone masonry wall in mud mortar was taken up and pointed wherever necessary.

15. SRI MAHAKUTA TEMPLE-COMPLEX, MAHAKUTA, DISTRICT BIJAPUR.—The southern side wall of the temple was dismantled and reconstructed after laying cement concrete foundation.

16. RAMESVARA TEMPLE, RAMANATHAPURA, DISTRICT HASSAN.—Lime coating over small *gopuram* of the temple was cleaned.

17. SRI AMRITESVARA TEMPLE, MIRLE, DISTRICT MYSORE.—The temple was transplanted from a paddy field. The work of providing compound wall was also taken up.

18. SRI KALLESVARA TEMPLE, ARALUGUPPE, DISTRICT TUMKUR.—Doors were provided to the temple. Plastering to brick masonry wherever required was also provided.

MADHYA PRADESH

Conservation works at the following monuments were undertaken by the Department of Archaeology and Museums, Madhya Pradesh:

19. SIVA TEMPLE, BHESDEHI, DISTRICT BETUL.

20. PALACES, ISLAMNAGAR, DISTRICT, BHOPAL.

20. GUJARI MAHAL, GWALIOR, DISTRICT GWALIOR.

21. LEELADHAR MANDIR, BARAI, DISTRICT GWALIOR.

22. LAL BAGH PALACE, INDORE, DISTRICT INDORE.

23. SIVA TEMPLE, CHANDKHURI, DISTRICT RAIPUR.—The area around the temple was fenced with barbed wire.

24. SWASTIK-VIHAR, SIRPUR, DISTRICT RAIPUR.—Ceiling of the main sanctum was reconstructed. The walls of monastery were pointed and watertightened wherever necessary and vegetation growth removed.

25. DEEPADI PANCHANAN TEMPLE, DISTRICT SARGUJA.

26. PALACE-COMPLEX, ORCHCHA, DISTRICT TIKAMGARH.—The debris around the palace was cleared.

27. VISHNU CHATUSILA, UJJAIN, DISTRICT UJJAIN.

28. SOLAKHAMBI, DADOH, DISTRICT VIDISHA.

29. BALAJI MANDIR, VIDISHA, DISTRICT VIDISHA.

MANIPUR

The following monuments were conserved by the Manipur State during the year under review:

30. TEMPLE OF LEIMAPOKPA KEIRUNGBA, IMPHAL, DISTRICT IMPHAL.

31. SAMADHI AND GATEWAY OF MAHARAJA GAMBHIR SINGH, KANCHIPUR, DISTRICT IMPHAL.

32. BEITHOB, KANGLA, DISTRICT IMPHAL.

33. TEMPLE OF BRINAMCHANDRA, KANGLA,. DISTRICT IMPHAL.

34. TEMPLE OF SHRI SHRI GOVINDAJI, KANGLA, DISTRICT IMPHAL.

35. SAMADHI OF MAHARAJA KHABA, URIPOK, DISTRICT IMPHAL.

36. TEMPLE OF THANGAL GENERAL, WANGKHEI, DISTRICT IMPHAL.

NAGALAND

Conservation works at the following monuments were undertaken by the Department of Art and Culture, Nagaland:

37. SECOND WORLD WAR TANK, KOHIMA, DISTRICT KOHIMA.

38. SOPFUNUO MEMORIAL, MUKHROMA, DISTRICT KOHIMA.

39. JINA AND EDIBEN MEMORIAL, MONGCHEN, DISTRICT MOKOKCHUNG.

40. WOODEN SCULPTURES, SHANGYU, DISTRICT MON.

41. HISTORICAL SITES, CHUNGLIYIMTI, DISTRICT TUENSANG.

IX. EXPEDITIONS OUTSIDE INDIA

1. REORGANIZATION OF THE CENTRAL ARMED FORCES MUSEUM LUANDA, ANGOLA

With a view to reorganizing the Central Armed Forces Museum, Luanda, a team of the Survey headed by D.K. Sinha was deputed to Luanda. The team started ground work like setting up of a chemical laboratory, a carpentry workshop and a photo studio, before taking up structural conservation, chemical treatment and accessioning of objects, photo-documentation, electrification, etc.

2. TREATMENT OF MURAL PAINTINGS IN TONGZA DZONG AND DO-DE DRAK MONASTERIES NEAR THIMPU, BHUTAN

The chemical preservation of the murals of Nekhang-Lhakhang and Mithrugpe-Lhakhang of the Tongza Dzong and Do-De-Drak monasteries was taken up by the team from the Chemical Branch of the Survey.

The major problem of the murals in the Nekhang-Lhakhang were longitudinal cracks in the wall due to earthquakes, the deposit of dust and dirt, soot of-carbon due to constant burning of butterlamp and incense sticks and oils deposited on' the lower portion of the paintings. The earlier structural repairs carried out in the monastery by filling in the cracks with cement had also obliterated some of the paintings. The team started the work in the Lhakhang by documenting the murals and filling in of cracks. The bulged portions were set right by fluid plaster of Paris. Cleaning and removal of dust, dirt, oil and soot, was done by effective use of solvents and restrainers followed by two coats of 1% polyvinyl acetate.

Similar process was followed in the front wall of the Mithrugpe-Lhakhang, having major problems like the detachment of pigments, discolouration, accumulation of dust and dirt and presence of discoloured varnish.

In Do-De-Drak monastery, the paintings of the southern wall of the inner shrine of the first floor were taken up for chemical treatment.

3. PRESERVATION OF ANGKOR VAT TEMPLE, SIEM REAP, CAMBODIA

In continuation of the previous year's work *(1987-88,* p. 210), the team headed by B.S. Nayal of the Survey made further progress in the preservation of the Angkor Vat Temple, Siem Reap. Cambodia.

STRUCTURAL CONSERVATION.—The sunken and dislodged portions of the southern library between Third and Fourth Enclosures were dismantled and reconstructed. A concrete apron was provided around the northern and southern libraries. The remaining portion of the northern library was also dismantled and reset The work of setting of the southern side of the Esplanade was continued and

completed. The entrance porches and steps on the western side of the Third Enclosure were dismantled and reconstructed after strengthening the foundation. After reconstruction, the roof was watertightened and floorings reconditioned. The central tower of the Fourth Enclosure was also watertightened besides carrying out reconstruction of the missing roof of the southern half.

In the Samudramanthan Gallery on the east, semi-vaulted roof of the gallery was relaid with original stored stone blocks, dismantled earlier, after proper identification. The drainage system between the Second and Third Enclosures was also reactivized. The retaining wall of the northern Embankment of the moat was also dismantled upto 37 m and reconstructed.

CHEMICAL PRESERVATION.—The interior western and northern corridors of the Third Enclosure were taken up for chemical treatment. The micro-vegetational growth was removed by general solvents followed by consolidation and fungicidal treatment. To save the cleaned surface from further damage a preservative coat was applied to form barrier between the atmosphere and the main body of the stone.

X. ARCHAEOLOGICAL CHEMISTRY

TREATMENT OF MONUMENTS AND PAINTINGS[1]

ANDHRA PRADESH

1. RAMESWARASWAMI TEMPLE, TADPATRI, DISTRICT CUDDAPAH.—The eradication of vegetational growth and lime wash etc., was carried out using diluted aqueous solution of ammonia and teepol. The deposition of lime wash was removed by chemico-mechanical means using dilute acetic acid solution.

2. CHARMINAR, HYDERABAD, DISTRICT HYDERABAD.—Chemical cleaning for eradication of vegetational growths from north, east and north-west minarets of Charminar was continued using 3 : 1 mixture of aqueous ammonia and teepol. After cleaning, *2%* aqueous solution of sodium pentachlorophenate was applied as fungicide, followed by preservation with 3% solution of polymethyl-methacrylate in toluene.

3. THOUSAND-PILLARED TEMPLE, HANAMAKONDA, DISTRICT WARANGAL.—The chemical treatment work was carried out to the interior sculptures of Siva, Vasudeva and Suryanarayana *mandapas* for eradication of deposition of soot, greasy matter, mud, dust, dirt, lime wash patches, etc. Soot and greasy matters were removed using organic solvents viz., benzene, acetone and toluene, etc. Lime wash patches were removed using dilute aqueous acetic acid solution. Afterwards, the area was cleaned in dilute aqueous ammonia solution and teepol. Finally it was preserved using 2% polyvinyl acetate in toluene.

4. WARANGAL FORT, WARANGAL, DISTRICT WARANGAL.—The gateways of Warangal fort were affected by the thick growth of moss, lichen, deposition of lime and yellow stains of iron. Vegetational growths i.e., moss and lichens etc. were eradicated using 3 : 1 aqueous solution of ammonia and teepol. Deposition of lime wash was removed using dilute aqueous solution of glacial acetic acid and stains of iron were removed using dilute oxalic acid. After removing all the accretions, treated area was given fungicidal treatment with *2%* aqueous solution of sodium pentachlorophenate and finally preserved with 3% acrypol in toluene.

ASSAM

5. BISHNUDOL, JOYSAGAR, DISTRICT SIBSAGAR.—The thick growth of moss, lichen and dark patches were cleaned by using dilute aqueous solution of ammonia and detergent. Black patches were removed using dilute aqueous solution of oxalic acid. The treated area was given fungicidal treatment with 2% .aqueous solution and finally preserved with 4% preservative solution.

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[1] Information from the Director (Science) of the Survey.

6. DEVIDOL, JOYSAGAR, DISTRICT SIBSAGAR.—Chemical cleaning was carried out for eradication of thick growth of moss and lichen using dilute aqueous solution of ammonia and detergent. The treated area was given fungicidal treatment with *2%* aqueous fungicidal solution and finally preserved with 4% preservative solution.

7. GHANASHYAM'S HOUSE, JOYSAGAR, DISTRICT SIBSAGAR.—Chemical cleaning was carried out for eradication of thick growth of moss and lichen using dilute aqueous solution of ammonia and detergent. The treated area was given fungicidal treatment with 2% aqueous fungicidal solution and finally preserved with 4% preservative solution.

8. GOLAGHAR, JOYSAGAR, DISTRICT SIBSAGAR.-Chemical cleaning was carried out for eradication of thick growth of moss and lichen using dilute aqueous solution of ammonia and detergent. The treated area was given fungicidal treatment with aqueous fungicidal solution and finally preserved with 4% preservative solution.

9. KARENGHAR PALACE, JOYSAGAR, DISTRICT SIBSAGAR.—Chemical cleaning for eradication of moss and lichen was carried out using dilute aqueous solution of ammonia and detergent. Dark patches were removed by using dilute oxalic acid. The treated area was given fungicidal treatment with 2% fungicidal solution and finally preserved with 3% preservative solution.

10. RANGHAR PAVILION, JOYSAGAR, DISTRICT SIBSAGAR.—Chemical cleaning was carried out for eradication of thick growth of moss and lichen using dilute aqueous solution of ammonia and detergent. The treated area was given fungicidal treatment with 2% fungicidal solution and finally preserved with 3% preservative solution.

11. SIBDOL, JOYSAGAR, DISTRICT SIBSAGAR.—Chemical cleaning was carried out for eradication of thick growth of moss and lichen using dilute aqueous solution of ammonia and detergent. The treated area was given fungicidal treatment with 2% aqueous solution of zinc-silicofluoride and finally preserved with 3% of polyvinyl acetate in toluene.

BIHAR

12. ASOKAN PILLAR, LAURIA ARARAJ, DISTRICT CHAMPARAN.—The chemical treatment of pillar was carried out in order to remove moss and lichen using 5% aqueous solution of ammonia and *2%* aqueous solution of teepol. Black patches were removed using 5% aqueous solution of oxalic acid. The treated area was given fungicidal treatment with *2%* aqueous solution of sodium pentachlorophenate and finally preserved with 3% polyvinyl acetate in toluene.

13. ASOKAN PILLAR, LAURIA NANDANGARH, DISTRICT CHAMPARAN.—Chemical cleaning for eradication of moss and lichen was carried out using dilute aqueous solution of ammonia and detergent. Dark patches were removed by using dilute oxalic acid. The treated area was given

fungicidal treatment with 2% aqueous solution of sodium pentachlorophenate to check further growth of vegetation and finally preserved with 3% solution of polyvinyl acetate in toluene. The surface was finally treated using wax polish.

14. ASOKAN PILLAR, KOLHUA, DISTRICT VAISHALI.—The thick layer of moss and lichen was removed from votive stupa with dilute aqueous ammonia solution and detergent. In order to check the growth of vegetation, 2% aqueous solution of sodium pentachlorophenate was applied as fungicide and finally preserved with *2%* polyvinyl acetate in toluene.

The thick growth of moss and lichen was removed from pillar by using 5% aqueous solution of oxalic acid and 5% aqueous solution of sodium carbonate. The dust and dirt were removed with aqueous solution of teepol. To check further growth of fungus and vegetation, 2% aqueous solution of sodium pentachlorophenate was sprayed and then polished by wax.

DAMAN AND DIU

15. DAMAN MONUMENTS, DAMAN.—Stone sculptures and carvings were chemically cleaned using dilute aqueous solution of ammonia and teepol, etc. for removal of superficial accretions and finally preserved.

14 nos. of framed paper paintings were cleaned using organic solvents such as methanol, amylacetate, dichloromethane, etc., and finally preserved with polyvinyl acetate in toluene.

The paintings in the Daman monuments were chemically cleaned for removal of superficial accretions using organic solvents (pl. LXXXIV).

15. Diu FORT, DIU.—The cannons of Diu fort were chemically cleaned using chemicals like alkaline Rochelle salt for removal of encrustations of chlorides, particularly and to lesser extent, oxides, sulphates and carbonates, etc. and finally preserved with 3% solution of polyvinyl acetate in toluene after drying the objects.

DELHI

17. RED FORT, DELHI.—The chemical cleaning work at Diwan-i-Khas was carried out on the marble surface, pillars, arches and inlay work in the central hall using dilute aqueous solutions of ammonia, teepol and hydrogen peroxide for removal of coloured superficial accretions (pl. LXXXV).

The painted surface was chemically treated using organic solvents viz., acetone, butyl alcohol, xylene, toluene, triethanolamine, etc., for removal of dust, dirt alongwith oily and smoky accretions. Finally, the cleaned area was preserved.

The front wall facing west of platform of rampart and portion of two *burjis* at Lahori gate were subjected to chemical treatment using dilute aqueous solution of ammonia and detergent for eradication of thick, deposit of dust and dirt, etc., Dark patches were removed using dilute aqueous acetic acid and oxalic acid. The treated area was given fungicidal treatment and finally preserved with perspex solution in toluene. This work was done for the preparation of the Independence Day.

The chemical cleaning work was also carried out on the embossed designs on the plastered surface, inlay work on the marble in the central hall of Rang Mahal, embossed designs on the plastered surface and plaster surface decorated with mirror in Sheesh Mahal, part of Rang Mahal, for removal of dust, dirt, oily and smoky accretions using dilute aqueous solution of ammonia, teepol, hydrogen peroxide and triethanolamine.

The paintings were exposed on the three pillars in a five pillared room facing west in Rang Mahal by removing dust, dirt, oily and smoky accretions using organic solvents such as acetone, butanol, triethanolamine, etc. and finally preserved.

18. TOMB OF RAUSHANARA AND BARADARI, DELHI.—Chemical treatment of paintings on the walls was carried out for removal of dust, dirt, mortar, splashes, etc., by chemico-mechanical methods and by using organic solvents such as acetone, xylene, ethanolamine, carbon tetrachloride, butanol and turpentine oil. The exposed paintings showed floral designs.

19. HUMAYUN TOMB, NEW DELHI.—Chemical treatment work was carried out on marble and sandstone surfaces for removal of dust, dirt, moss, lichen and calcareous deposits on the south-west corner wall, facing entrance using dilute aqueous solution of ammonia, teepol, hydrogen peroxide, chloromine-T, etc. The treated area was given fungicidal treatment and finally preserved.

20. TOMB OF SIKANDAR LODHI, NEW DELHI.—Chemical treatment work was carried out on *burjis,* parapet wall and pillars for removal of superficial accretions using dilute aqueous solution of ammonia and teepol. The treated area was given fungicidal treatment and finally preserved.

GOA

21. BASILICA OF BOM JESUS, VELHA GOA, DISTRICT GOA.— The wooden altars and blessed sacrament were subjected to dusting and burnishing. The chemical treatment and preservation of canvas and panel paintings was also carried out and completed.

22. STONE SCULPTURES AND BRONZE STATUES, VELHA GOA, DISTRICT GOA.—The chemical treatment work on pillars and cross in front of the Church of St. Francis of Assisi and Viceroy gate was carried out for removal of vegetational growth. Finally, the treated surface was preserved.

GUJARAT

23. DWARKADHISH TEMPLE COMPLEX, DWARKA, DISTRICT JAMNAGAR.—The excavated sculptures from Dwarkadhish temple complex were subjected to chemical treatment for removal of superficial accretions which were obliterating the details.

24. RANI-KI-VAV, PATAN, DISTRICT MEHSANA.—The chemical treatment work for removal of moss and lichen etc., was carried out using dilute solution of ammonia, teepol, etc.

25. SUN TEMPLE, MODHERA, DISTRICT MEHSANA.—Superficial accretions such as dust, dirt, vegetational growth and lime wash, etc., from sculptures were removed, using dilute aqueous solution of ammonia, teepol and acid. Finally the treated area was preserved with polyvinyl acetate solution in toluene.

26. JAMI MASJID, CHAMPANER, DISTRICT PANCH MAHALS.—The stone sculptures and carvings of Jami Masjid were subjected to chemical cleaning for eradication of superficial accretions such as moss, lichen, dust, dirt and lime wash, etc., using dilute acquecus solution of ammonia and teepol, etc., and lime wash was removed using dilute aqueous solution of acetic acid.

HARYANA

27. SHAH QULI KHAN'S TOMB, NARNAUL, DISTRICT MAHENDERGARH.—The interior walls and floor of the octagonal structure were subjected to chemical treatment using dilute aqueous solutions of ammonia and teepol for removal of dust, dirt, smoke, etc., The adamant yellow stains of iron oxide were removed by repeated application of hydrogen peroxide. The treated area was given fungicidal treatment with 1% solution of polymethyl methacrylate in toluene.

The paintings on the ceiling were subjected to chemical treatment for removal of superficial accretions of dust, dirt, insect, cocoons, etc., using organic solvent *viz.,* amyl acetate, methyl alcohol, n-butyl alcohol, etc. The consolidation of flaking pigments was carried out using 5% solution of polyvinyl acetate in toluene. Finally, the paintings were preserved with 2% solution of polyvinyl acetate.

HIMACHAL PRADESH

28. LAKSHANA DEVI TEMPLE, BHARMAUR, DISTRICT CHAMBA.—The fine wooden carvings of the temple which were covered with dust, dirt, thick paint layer, smoke, grease, etc., were subjected to chemical treatment for removal of superficial accretions using organic solvents such as amyl-acetate, butyl lactate, triethanolamine, methyl alcohol, ammonia and teepol mixture. The work is in progress.

29. SIVA AND SANDHYA GAYATRI TEMPLES, JAGATSUKH, DISTRICT KULLU.—The wooden carvings, ornamental designs and sculptures on the walls of Sandhya Gayatri temple were covered with thick paint layer, dust, dirt, grease, smoke and vegetational growth. The hardened paint layers, smoke and grease were removed using organic solvent viz., triethanolamine, petroleum ether, methanol, solvent ether, etc. The vegetational growth was removed using 2% dilute aqueous solution of ammonia and teepol.

The Siva temple was affected by the thick vegetational growth, smoke and oily accretions. The vegetational growth was removed using 2% dilute aqueous solution of ammonia and teepol, while smoke and oily accretions were removed by using mixture of teepol, ammonia and triethanolamine. The work is in progress.

30. ARDHANARISVARA TEMPLE, MANDI, DISTRICT MANDI.—Thick growth of moss and lime wash was removed by using dilute aqueous solution of ammonia and teepol. The lime wash coatings were removed using 3% aqueous solution of acetic acid. The work is in progress.

31. TRILOKINATH TEMPLE, MANDI, DISTRICT MANDI.—The thick growth of moss and lime wash interspersed with vegetational growth was removed with the help of 2% dilute aqueous solution of ammonia and teepol. The work is in progress.

KARNATAKA

32. TIPU SULTAN'S PALACE, BANGALORE, DISTRICT BANGALORE.—The superficial accretions were removed and the paintings exposed by mechanical means.

33. ASAR MAHAL, BUAPUR, DISTRICT BUAPUR.—The chemical treatment work of paintings was carried out for removal of superficial accretions such as dust, dirt and old translucent preservative coating, etc., using organic solvents viz. acetone, methanol, toluene, denatured spirit, turpentine oil, etc. The treated area was preserved with polyvinyl acetate in toluene.

The chemical treatment work was also carried out on wooden railings on first floor for removal of superficial accretions such as dust, dirt, bird's excreta, drops of enamel paints, etc., using solvents like denatured spirit, ammonia and methanol etc.

34. GROUPS OF TEMPLES, LAKKUNDI, DISTRICT DHARWAR.—The chemical cleaning work was carried out for eradication of vegetational growth like moss, lichen, etc., using dilute aqueous solution of ammonia and teepol and lime-wash was removed using dilute aqueous solution of acetic acid. The treated area was given fungicidal treatment.

35. LAKSHMI-NARAYANA TEMPLE, HOSAHOLALU, DISTRICT MANDYA.—The stone sculptures of Lakshmi-Narayana temple were subjected to chemical treatment for eradication of vegetational growths using dilute aqueous solutions of ammonia and teepol etc.

36. DARIA DAULAT BAGH, SRIRANGAPATNA, DISTRICT MANDYA.—The chemical treatment of paintings was carried out after doing the consolidation of pigment layers, filleting, edging of ground, fixing of torn and loose canvas etc. for removal of superficial accretions such as dust, dirt, old translucent preservative coatings, etc.

37. MADHUKESWARA TEMPLE, BANAVASI, DISTRICT NORTH CANARA.—The superficial accretions such as vegetational growth, lime wash, soot and tarry matters, etc. were removed using dilute aqueous solution of ammonia, teepol, etc. Lime wash patches were removed using dilute aqueous solution of acetic acid. Soot and tarry matter were removed by chemico-mechanical means using organic solvent. The treated area was given fungicidal treatment.

38. RAMESVARA TEMPLE, KELADI, DISTRICT SHIMOGA.—The chemical cleaning work was carried out for removal of superficial accretions such as vegetational growth, lime wash, soot and tarry matters, etc. The vegetational growth was removed by using dilute aqueous solution of ammonia, teepol, etc. Lime wash patches were removed using dilute aqueous solution of acetic acid. Soot and tarry matters were removed by chemico-mechanical means using organic solvents. The treated area was given fungicidal treatment.

KERALA

39. SIVA TEMPLE-COMPLEX, PERUVANAM, DISTRICT TRICHUR.—The wooden carvings and bracket figures around Madathilappan shrine in Siva temple-complex were covered with dust, dirt, soot, grease, etc. These were removed using organic solvents such as toluene, benzene, methylated spirit etc., and dilute aqueous solution of ammonia and teepol. Wooden images were strengthened and repaired using saw-dust and fevicol. The treated surface was given fungicidal treatment with *2%* solution of sodium pentachlorophenate in benzene and finally preserved with polyvinyl acetate in toluene.

MADHYA PRADESH

40. KANDARIYA MAHADEVA TEMPLE, KHAJURAHO, DISTRICT CHHAITARPUR.—The vegetational growth, etc., was removed using 2-3% aqueous solution of ammonia and 1% aqueous solution of teepol, etc.

41. BAGH CAVES, BAGH, DISTRICT DHAR.—The dust, dirt, fungal growth and other accretions were removed from Caves 2 and 3. The insecticidal treatment in the cells of Caves 3 and 4 with formaldehyde solution in toluene and Baygon solution (mixed with pyrethrum and malathion) in order to arrest insect activity was also carried out. Fumigation work was also carried out in Caves 3 and 4 with aluminium phosphide and ethylene dibromide, resulted in death of nearly 200 bats. Insect repellants were also spread around the stripped and mounted panels of paintings kept in the workshop shed and stores. The repairing work of sculptures of Cave 2 was carried out using steel wires, stainless steel rod, plaster of Paris, earth colours, etc.

42. TOMB OF TANSEN, GWALIOR, DISTRICT GWALIOR.—Lime wash deposits were removed chemically by using 2% aqueous solution of acetic acid. The treated area was given fungicidal treatment with dilute aqueous solution of sodium pentachlorophenate.

43. BAHU TEMPLE, NAGDA, DISTRICT UJJAIN.—Superficial accretions such as dust, dirt, vegetational growth, limewash, etc., were removed using dilute aqueous solution of ammonia and teepol. The lime wash was removed with the help of dilute aqueous solution of acetic acid.

MAHARASHTRA

44. AJANTA CAVES, AJANTA, DISTRICT AURANGABAD.—Thick coat of old shellac, etc., from the pillar 6, 7, 14 and 15 in Cave 17 was removed using different organic solvents and beautiful floral designs and flying figures exposed.

Thick moss, lichen, etc., from the facade sculptures of Cave 1,16,17 and 26 was removed with the help of 1-3% aqueous solution of ammonia and 1% aqueous solution of teepol. The treated area was given fungicidal treatment with aqueous solution of sodium pentachlorophenate and finally preserved with 1% solution of polyvinyl acetate in toluene.

The work of consolidation of loose plaster and paintings, filling of holes, edging, etc., was carried out in Cave 2 and 9 with plaster of Paris, adhesive, suitable earth colours, etc., and matched with the surroundings. In addition to the above, urgent filleting work of bulging in Cave 17 was also carried out (pl. LXXXVI).

45. BIBI-KA-MAQBARA, AURANGABAD, DISTRICT AURANGABAD.—Accretions of dust, dirt, moss, lichens, brown spots, calcareous deposits, etc., were removed from marble, stone and stucco of the mausoleum using 1% aqueous solution of teepol. Brown spots were removed from the marble using 2% aqueous solution of chloramine-T. Thick and tough calcareous deposits were removed by chemico-mechanical means using sodium-hexametaphosphate. After cleaning, the treated surface was given fungicidal treatment with 2% aqueous solution of sodium penta-chlorophenate and finally preserved with 3% solution of polymethyl methacrylate in toluene.

46. ELLORA CAVES, ELLORA, DISTRICT AURANGABAD.—Moss, lichens, etc., from Elephants Row, Lower Kailash Cave 16 were removed by using dilute aqueous solution of ammonia and detergent. The treated area was given fungicidal treatment with 2% aqueous solution of sodium penta chlorophenate and finally preserved with 3% solution of polymethyl methacrylate in toluene.

The chemical cleaning work of *dhvajastambha* and *kirtistambha* was carried out for removal of moss, lichens, etc., using dilute aqueous solution of ammonia and detergent. The treated area was given fungicidal treatment with 2% aqueous solution of sodium pentachlorophenate and finally preserved with polymethyl methacrylate in toluene.

Stone sculptures at back corridor, affected by vegetational growth such as moss, lichen, calcareous deposits, etc., were chemically treated using dilute aqueous solution of ammonia and detergent, etc., Calcareous deposits were removed using dilute aqueous solution of acetic acid. The treated area was given fungicidal treatment and finally preserved with 3% solution of perspex in toluene.

Superficial accretions from *garbhagriha* paintings of Cave 12 were also removed. Fixing and filleting work of paintings have also been carried out. Floral designs and figures are visible after chemical cleaning.

47. CHANGDEO TEMPLE, CHANGDEO, DISTRICT JALGAON.—The stone sculptures, bricks and plastered surface was covered with heavy dust, dirt, bird excreta, moss, lichens, lime wash, etc. The superficial accretions except lime wash were removed using 3% dilute aqueous solution of ammonia and 2% dilute aqueous solution of detergent. Lime wash deposits were removed using 1% aqueous solution of acetic acid. Filling up of cracks and consolidation of loose stone work was carried out using epoxy resin, rock powder and silica flour. The treated surface was given fungicidal treatment by 2% aqueous solution of sodium pentachlorophenate.

The portion of *sabhamandapa,* interior of antechamber and shrine of temple were covered with thick layers of acrylic paint. The acrylic paint was removed first by treating with dilute solution of sodium hydroxide and afterwards with mixture of organic solvents such as alcohol, ketone, hydrocarbon and little acetic acid. The thick coatings of oily *sindoor* were removed using dilute sodium hydroxide and finally preserved with 2% solution of polymethyl methacrylate in toluene.

ORISSA

48. DAKSHA PRAIAPATI TEMPLE, BANPUR, DISTRICT PURL—The *vimana* and the roof of *bhoga-mandapa* of the temple, covered with thick growth of moss, lichen, dust, dirt, etc., were cleaned using 2% aqueous solution of ammonia and 1% aqueous solution of teepol. The *jagamohana* of the temple-complex was covered with thin layer of lime. The lime layers were removed by using 2% aqueous solution of acetic acid. The treated area was given fungicidal treatment with 1% aqueous solution of sodium pentachlorophenate and finally preserved with 1% perspex solution in toluene.

49. LINGARAJA TEMPLE, BHUBANESWAR, DISTRICT PURL—The chemical treatment work on *jagamohana* was continued. The *mastaka, the mundi, beki* and the first row of *pidas,* covered with thick growth of dried moss and lichens, etc., were cleaned using aqueous solution of 2-3% ammonia and 1% aqueous solution of teepol. The treated area was given fungicidal treatment with 1% aqueous solution of zinc-silico fluoride and finally preserved with 1% solution of polymethyl methacrylate in toluene.

50. SUN TEMPLE-COMPLEX, KONARAK, DISTRICT PURL—The northern, western sides and plinth walls of the Sun temple-complex having fine carvings were covered with superficial accretions such as moss, lichens, hornet nests, cobwebs and bird's excreta, etc. due to which details of carvings were obliterated. These accretions were removed using 2% aqueous solution of ammonia and 1% aqueous solution of teepol. Some black spots were cleaned with dilute aqueous solution of oxalic acid. The treated area was given fungicidal treatment with 1% aqueous zinc silico fluoride solution. Finally to consolidate and preserve the surface, three coats of 1% polymethyl methacrylate were given in sulphur free toluene.

5\. JAGANNATHA TEMPLE, PURI, DISTRICT PURL—The deplastering work on the exterior surface of *vimana* (8 *pidas* above the spring level) was taken up for removal of tenacious lime plaster

accretions by chemicomechanical methods using 2-3% aqueous acetic acid. Afterwards, the surface was treated with 1% aqueous solution of teepol.

The deplastering work on the exterior of the *vimana* starting from *kalasa* to the vertical walls facing east and west of Surya-Narayana temple was subjected to chemical treatment using dilute aqueous solution of acetic acid followed by thorough washing.

RAJASTHAN

52. KALIKA MATA TEMPLE, CHITTAURGARH, DISTRICT CHITTAURGARH.—The stone sculptures and carvings of Kalika Mata temple were subjected to chemical treatment using dilute aqueous solution of ammonia, teepol, etc., for removal of dust, dirt, moss, lichens, etc. Dilute aqueous solution of acetic acid was used for removal of deposition of lime wash. Finally, the treated area was preserved by 3% solution of acrypol and dibutyl phthalate in toluene.

53. PATWON-KI-HAVELI, JAISALMER, DISTRICT JAISALMER.—Chemical treatment of paintings on the 1st and 3rd floor was carried out using organic solvents for the removal of superficial accretions such as dust, dirt, old varnish, etc. Finally, the treated area was preserved with polyvinyl acetate in toluene.

The stone sculptures were also subjected to chemical treatment using dilute aqueous solution of ammonia and teepol for removal of superficial accretions.

TAMIL NADU

54. OLD LIGHT HOUSE, VARAHA AND RAMANUJA MANDAPAS, MAHABALIPURAM, DISTRICT CHINGLEPUT.—The granite stone sculptures, affected by the thick growth of moss, lichens, etc., were cleaned using dilute aqueous solution of ammonia and teepol. Treated area was given fungicidal treatment with 2% aqueous solution of sodium pentachlorophenate and finally preserved with two coatings of Acrypil-P in toluene.

55. BRIHADISVARA TEMPLE, THANJAVUR, DISTRICT THANJAVUR.—The stripping work of Nayaka paintings from Chola paintings in the chamber 10 of the circumambulatory passage around the *garbhagriha* was continued by distacco process. The Nayaka paintings were given facing by using thin and thick cloth with 20-25% polyvinyl acetate in toluene. After the facing dried up, the Nayaka paintings were stripped carefully to expose underneath Chola layer. Then the exposed Chola paintings were treated with organic solvents viz. benzene, butyl lactate, diacetone, alcohol, toluene, turpentine, etc., and consolidated with plaster of Paris and fevicol and finally preserved with 2-3% solution of polyvinyl acetate in toluene.

The stripped pieces of Nayaka paintings were joined and transferred over a specially prepared mount with fibre glass backing and araldite base. Aluminium beedings were also provided to give support for the purpose of display. The cloth facings were removed using toluene. The chemical

cleaning was also carried out wherever necessary and afterwards colour matching work was carried out, followed by application of 3% polyvinyl acetate solution in toluene. Four pieces of mounted panels of Nayaka paintings are ready for display.

UTTAR PRADESH

56. ITIMAD-UD-DAULA, AGRA, DISTRICT AGRA.—The marble canopy of Itimad-ud-Daula was affected by the deposits of dust, dirt, soot, tarry matters and other particulate matters. Accumulation of particulate matters caused discolouration of marble. The removal of dust, dirt was carried out using dilute aqueous solution of ammonia, teepol and hydrogen peroxide in the ratio of 3:2:1. Soot and tarry matters were removed using organic solvents such as triethanolamine and methanol. A pack of magnesium trisilicate and aluminium silicate in the ratio of 1:4 was used for removal of sticky particulates.

57. TAJ MAHAL, AGRA, DISTRICT AGRA.—The exterior surface of the main mausoleum was covered with dust, dirt, tarry matter and other particulate deposits, resulting in the appearance of stains of brownish yellow tint. The chemical cleaning work was carried out using aqueous mixture of ammonia teepol, hydrogen peroxide, triethanalamine, etc. Surface deposits of sticky particulate matters were removed with a pack of magnesium trisilicate and aluminium silicate followed by thorough washing with distilled water (pl. LXXXVII).

58. SHAIKH SALIM CHISTI DARGAH, FATEHPUR SIKRI, DISTRICT AGRA.—The marble screens and marble of Dargah were covered with dust, dirt, soot and greasy matters, resulting in brownish yellow stains. The marble surface was' cleaned using 1-3% mixture of ammonia, teepol and hydrogen peroxide in the ratio of 3:2:1 in distilled water. For removal of soot, greasy matters and stains, etc. organic solvents such as triethanolamine and methanol in the ratio of 1:2 making 1-2% mixture in distilled water were used.

59. GROUP OF TEMPLES, DWARHAT, DISTRICT ALMORA.—The work of removal of moss and lichen from the exterior walls of temples was carried out with 5% solution of ammonia and dilute surface detergent solution. The treated area was given fungicidal treatment with 3-5% zinc silicofluoride solution followed by preservation with 3% polyvinyl acetate in toluene.

60. GROUP OF TEMPLES, JAGESHWAR, DISTRICT ALMORA.—The exterior walls of larger group of temples were covered with thick growth of moss and lichens. The chemical cleaning work was carried out using dilute aqueous solution of ammonia and teepol. The treated area was given funigicidal treatment with 3% zinc silicofluoride and finally preserved with 3% polyvinyl acetate solution in toluene.

61. KHUSROBAGH, ALLAHABAD, DISTRICT ALLAHABAD.—The exterior walls of the tomb were subjected to chemical cleaning for removal of dust, dirt, moss and lichens, etc., using 5% aqueous

solution of ammonia and 1-3% teepol solution. The treated area was given fungicidal treatment with 3% aqueous solution of zinc silicoflouoride and finally preserved with 3% solution of polyvinyl acetate in toluene.

62. FORT, JHANSI, DISTRICT JHANSI.—The work of removal of multi-coloured paintings of various advertisements in oil and acrylic emulsion from the front wall continued using mixture of organic solvents such as acetone, benzene dioxane, methyline dichloride, etc. The treated area was given fungicidal treatment with 3% aqueous solution of zinc silicofluoride and finally preserved with 3% solution of polyvinyl acetate in toluene.

63. DHAMEKH STUPA, SARNATH, DISTRICT VARANASI.—The removal of dust, dirt, vegetational growth, etc., from the brick structure (excluding top) work was carried out using dilute aqueous solution of ammonia and teepol. The treated area was given fungicidal treatment with 2% solution of sodium pentachlorophenate and finally preserved with 2% solution of acrypol in toluene.

64. LAL KHAN'S TOMB, VARANASI, DISTRICT VARANASI.—The chemical cleaning work was carried out for removal of dust, dirt, vegetational growth, black patches, etc., using dilute aqueous solution of ammonia, teepol and oxalic acid, while black patches were cleaned using organic solvents. The treated area was given fungicidal treatment with 2% aqueous solution of sodium penta chlorophenate finally preserved with 2% solution of acrypol in toluene.

65. MAN SINGH OBSERVATORY, VARANASI, DISTRICT VARANASI.—Chemical cleaning work was carried out for removal of dust, dirt, vegetational growth i.e. moss, lichen, etc. and black patches of vegetation using dilute aqueous ammonia solution and oxalic acid. The treated area was given fungicidal treatment with 2% aqueous solution of zinc silicofluoride and finally preserved with 2% solution of acrypol in toluene.

TREATMENT OF EXCAVATED OBJECTS AND MUSEUM EXHIBITS[1]

1. One hundred twenty-six copper and one hundred and four iron objects, received from Sanghol excavations were chemically treated and preserved.

2. One hundred library books and two hundred nineteen pages of manuscripts of the *Quran* were fumigated, separated and developed in butter paper.

3. The stone sculptures from Archaeological Museum, Velha Goa, were subjected to chemical treatment for removal of superficial accretions using dilute aqueous solution of ammonia and teepol and finally preserved. Paintings were also chemically treated and preserved.

[1]Information from the Director (Science) of the Survey except items 12-16 and 17-18 which are from the Department of Archaeology, Gujarat, and National Research Laboratory for conservation of Cultural Property, Lucknow respectively.

4. The loose sculptures from Jardine Museum, Khajuraho, were chemically treated and the superficial accretions were removed using dilute aqueous solution of ammonia and teepol. The treated area was finally preserved.

5. Ten numbers of oil paintings on canvas from Hazarduari Palace, Murshidabad, were chemically treated for removal of old darkened varnish and superficial accretions using organic solvents such as diacetone alcohol, methyl ethyl ketone, butyl lactate, turpentine, etc. Out of ten paintings, three were relined using wax-resin mixture, side strips were fixed in two paintings and in remaining five paintings, mending of holes, etc., was carried out. Finally, all the paintings were preserved with mastic varnish. The frames of paintings were painted with bronze powder in methyl methacrylate solution and sides of frames were painted with golden brown acrylic paint (pl. LXXXVIII).

The armoury items like fifty swords, twenty-nine guns, sixteen spears, seven daggers, five battle axes and fourteen shields of the museum were also chemically cleaned to remove dust, superficial accretions by chemico-mechanical methods using sodium hydroxide, etc. and preserved.

The metallic objects such as four each of copper alloy aftabs and vases and five each of bronze statues and chandeliers were chemically cleaned by removing the incrustations with the help of alkaline Rochelle salt, citric acid, hydrogen peroxide, etc. and finally preserved.

One China clay flower vase was chemically cleaned with teepol. Two marble statues were chemically cleaned by 'clay pack' technique using magnesium trisilicate, ammonia, triethanolamine, etc.

One ivory dressing table was chemically cleaned using non-ionic surface detergent.

Two cut glasses of *huqqa* were cleaned using teepol and metallic parts of *huqqa* by using alkaline Rochelle salt and finally preserved.

Dusting of one hundred eighty-five library books was carried out and same were fumigated in fumigation chambers using chemicals like paradichlorobenzene and thymol etc.

6. Two thousand copper coins out of two thousand and fifty-seven received from Amaravati Museum, Amaravati, District Guntur, were chemically treated and preserved.

7. Twenty copper coins found from Papanasi and Kudavalli were chemically cleaned and preserved.

8. A copper-plate grant containing three copper-plates with a sealed ring received from Amaravati Museum, Amaravati, District Guntur, was subjected to chemical treatment and preservation.

9. Five each of copper alloy Harathi plates and stands received from Chandragiri, District Chittoor were chemically cleaned and preserved.

10. The chemical treatment and preservation of one hundred seventy-six copper coins, eighty-three lead coins, thirty-three copper objects, three silver objects, one gold object and thirty-four iron objects found during excavation at Adam (Maharashtra) is in progress.

11. Forty-one copper coins received from Thanesar excavation, Kurukshetra (Haryana) were chemically treated and preserved.

12. Three wooden gates of Mahabat Maqbara, Junagadh which were covered with silver foil were taken up for chemical treatment. Dust and dirt were removed from the silver foil with smooth brush. The 15% to 20% solution of liquid ammonia water was applied on the affected area of silver foil with soft brush and rubbed according to the effect and removed then washed with water and distilled water. After the surface of silver foil completely dried up, 3% polyvinyl acetate in toluene was applied as a preservative coating.

13. Silo, furnace, oven (about 12 nos.) and mud brick structures (4 nos.) exposed during excavation at Kuntasi in District Rajkot were found in fragile condition.

All loose soil particles were removed by smooth brush. Then all these structures were given coating of solution 2% to 3% Fevicol + water. When this coating completely dried, then 5% polyvinyl acetate in toluene (sulphur free) solution coating was applied on all parts of these structures. At last the structures were covered with sand so that structures, silo, furnace, oven were preserved, from rain and weathering effect.

14. The wall paintings at the Deputy Collector's office at Anjar, District Kutch, were taken up for chemical treatment.

The east, west and south wall paintings were affected by dirt, dust and chalky substance and also effected by ultraviolet rays from fluorescent tubelight and sunlight, which oxides bring the pigment colour dull. The painting also effected by variation of temperature and relative humidity effect the painting.

Dirt and dust on the wall painting was removed by smooth brush and chalky effect of painting were removed with N. Butanol +1. sopropenol (1:1) and preserved with 2% polyvinyl acetate in toluene.

15. Thirty-two billon coins, found from village Dholara, Taluk Lothika, District Rajkot were taken up for treatment. The coins were treated with 5% solution of formic acid (HCOGH)+water. Then washed with water and 2% polyvinyl acetate in toluene applied as a preservative coating.

Consolidation of unbaked clay objects: Unbaked clay objects and seals found from excavations of rock-cut cave, Siyot, District Kutch with 4% polyvinyl acetate in toluene and preserved in polythene bags and two or three holes made in the bags, so that the moisture evaporates very slowly from the objects and stabilizes the atmosphere.

16. Sixteen pieces of pottery and other objects from excavation at Valamiyo mound, Shikarpur, District Kutch, were cleaned with 2% hydrochloric acid + water ($HC_1 + H_2O$) solution and then washed with water and finally 3% polyvinyl acetate in toluene was applied as a preservative coating.

17. Ninety-one bronze, sixty-eight iron, sixty-eight copper coins, eight miniature paintings, seven oil paintings, one hundred ninety leaves of manuscript *Krishna-Lila,* one *pichhwai* received from different institutions were chemically treated and preserved by NRLC, Lucknow,

18. The Regional Conservation Laboratory, Mysore, of the NRLC has also taken up chemical treatment and preservation of eighty-nine wooden panels, wall paintings of Venkataramana temple, Mysore, four oil paintings, sixty-four bronzes, sixteen copper coins, fifty-four iron objects, five ivory objects, one stone sculpture, three terracottas and one photograph.

ANALYSIS AND RESEARCH[1]

1. EFFECT OF NOX GASES ON MARBLE AND SANDSTONE OF TAJ MAHAL, AGRA.—Effects of NOX gases viz., nitrogen dioxide, nitric oxide, etc., were studied on standard samples of marble and sand stone in order to assess the harmful effects of these gases. The concentration levels of NOX were raised step by step under a standard ambient environment prevailing inside the test chamber and after a definite time, the change in weight (gain) was taken as an indication of the concentration versus damage ratio. This is still continuing and is only a qualitative assessment.

2. X-RAY DIFFRACTION STUDIES.—These studies were carried out for the analysis of pottery (Harappan), glazes from Mughal structures and marble samples in order to find out the nature and composition of various minerals associated with these types of materials as well as to assess the purity of variety of stones.

3. SCANNING ELECTRON MICROSCOPIC STUDIES.—With the help of this instrument surface enrichment studies have been carried out to study different coloured glaze samples and to study the deposition phenomenon on the surface. It was again a qualitative study.

4. ATOMIC ABSORPTION SPECTROPHOTOMETRIC STUDIES.—These studies are of great help for quantitative analysis of trace elements which is sometimes difficult by classical chemical methods. With the help of this technique a number of glaze samples obtained from monuments and a few marble samples from Taj Mahal, Agra, were analysed quantitatively for their chemical composition including the trance elements.

5. STUDIES REGARDING BINDING MEDIA IN ANCIENT PAINTINGS.—These studies were carried out in order to get information regarding chemical characteristics of binding medium used in ancient paintings which helps in selecting suitable similar materials for restoration of the same. Infra-red spectroscopy was used for the study of chemical nature of binding medium in the paintings from Leh, Jammu and Kashmir, to get information with respect to type of material used.

[1]Information from the Director (Science) of the Chemistry Branch of the Survey except items 8-13 received from National Research Laboratory for Conservation of Cultural Properly, Lucknow.

6. THERMOGRAVIMETRIC AND DIFFERENTIAL THERMAL ANALYSES.—TG-DTA studies of Harappan potteries and other potteries have been done under this project to ascertain firing temperature, composition of pottery, etc.

In addition to above projects, different samples of potteries, glazes, ceramic portion of glaze, marbles, fibre, bangles, plasters, pigments, etc., from different sites were chemically analysed to find out their composition and physical parameters such as density, porosity, penetrability, etc.

7. AIR POLLUTION AND METEOROLOGICAL STUDIES.:—The Pollution Laboratory, Agra, of the Survey was actively engaged in air pollution and meteorological studies in order to protect the monuments of Agra-Mathura region from pollution threat. This laboratory is keeping a close watch on the pollution level of the pollutant gases coming out from foundries, refinery, transport vehicles and other sources.

The measurement of most harmful sulphur dioxide gas was carried out for 24 hours at Taj Mahal and Sikandra, Agra, on an hourly basis with automatic SO_2 gas analyser based on conductance in order to assess the air quality in the ambient air around Taj and Sikandara and data with regard to change in pattern was completed as previously done.

The abrasive action of dust containing sand on monuments not only erodes the surface of stone due to its nature but also helps in initiating some chemical reactions. Its measurement was thus carried out at Taj Mahal, Red Fort and Sikandra, Agra, in order to assess the quality of air and its comparative effect on different monuments. Studies have shown presence of many chemical species in the dust and its lower pH indicates its acidic nature.

Suspended particulate matter being air borne causes much harmful effects to the surrounding monuments. Monitoring of SPM was thus necessary and was done with the help of high volume air sampler. A complete analyses in respect of all its elemental ingredients was done.

The sulphation rate studies were undertaken by lead candle method at Taj and Sikandra, Agra, to know the impact of all the oxides of sulphur.

Certain meteorological parameters viz., temperature, relative humidity and rainfall cause direct and indirect damage to stone materials. These parameters either directly cause physical damage or indirectly create favourable condition for certain chemical reactions to start which ultimately attack the stone surface. Studies were thus carried out at Taj Mahal, Agra, to assess the condition and to adopt proper protective measure.

8. EVALUATION OF CLEANING METHODS FOR THE REMOVAL OF IRON STAINS FROM MARBLE.—NRLC stone laboratory has done work of methods of removal of rust stains. Rusted stains were developed on polished marble samples artificially by keeping them in contact with rusted iron pieces. Different reagents recommended for the cleaning of such stains from marble were evaluated by testing their efficacy in removing the stains and the damage caused by the reagents to the stone samples was also evaluated by the measurement of different physical parameters, the examinations of the surface deposits developed, if any. The same reagents were tested on the weathered marble samples also. In all, 14 formulations were tested.

9. STUDIES ON DETERIORATION OF CONSERVATION OF METALS.—<i) A method of stabilise bronze disease using zinc powder was standardized and the efficacy of the method was tested by keeping the objects in adverse environmental conditions of relative humidity for a prolonged length of time. The method was found to be highly successful.

(ii) Normally the patina is affected while removing stubborn surface deposits from metal objects with conventional methods. A method was developed to remove such accretions. The method holds good promises; however, some more experimentation is required to be done to standardize the procedure.

10. STUDIES ON THE METHODS OF PRESERVATION OF BIRCH BARKS AND PALM-LEAF MANUSCRIPTS.—The effect of conventional adhesives in fixing the layers of birch bark was studied and a method for the treatment of separating layers of birch bark was standardized. Different techniques of lamination and filling gaps by using new bark were evaluated.

These adhesives were also tried for the repair of palm-leaf manuscripts and the effect of different oils to increase the flexibility and softness of palm-leaf was tested.

11. MICROBIAL DETERIORATION OF WALL PAINTINGS.—The efficacy of biocides like O-phenyl phenol, p-chloro-cresol, cetolpyridinium chloride, phenyl mercuric acetate, sodium pentachlorophenate and preventol R-90 were tested against different fungal forms isolated and identified on Ajanta wall paintings. Different concentrations of biocides were ivaculated with the test fungus in a suitable media, and their efficacy was evaluated by recording colony diameter at regular intervals. It was found that phenyl mercuric acetate was very effective. Other biocides also prevented the growth of fungus, but required higher concentrations of the reagents. The efficacy of these biocides and their effect on the materials of the wall paintings are being, studied on the test samples of wall paintings prepared in the laboratory.

The study of the biodeterioration problems of wall paintings of Nagaur fort was carried out. The samples of aerospora and microflora of wall paintings were collected and cultured in the laboratory, and the fungal species were identified.

Aeroflora studies of wall paintings of Hampi and Sibi were done and fungal species were identified. Fungicides already tested in the laboratory were applied at Virupakshasvami temple, Hampi. These fungicides were O-phenyl phenol, phenyl mercuric acetate. Their efficacy over a prolonged length of time will be evaluated by examining the condition of the paintings from time to time.

12. STUDY OF EFFICACY OF NATURAL PRODUCTS AGAINST INSECTS.—Ajanta wall paintings were found to be heavily infested with silver fish. The silver fish specimens were collected and reared in the laboratory. Since insecticides in general, should be avoided to come in contact with the objects of cultural property, particularly paintings, the natural products, traditionally used in India as insecticides and insects repellents, were tested against silver fish. The experiments were further

enlarged to include other insect species, commonly found in museums. Some very interesting results were obtained. The studies are continuing.

13. STUDY OF PLANT GUMS USED IN WORKS OF ART.—Plant gums have been used in works of art extensively, particularly in miniature wall paintings and illustrative manuscripts. Since these gums are derived from different plants, they show different deterioration pattern and behave differently towards different solvents required for their cleaning. It was important to characterize the plant gums in art objects before attempting their cleaning. These studies would also help in understanding the deterioration phenomenon. The methods available so far for the analysis of plant gums did not meet with success in case of aged plant gums, as they are encountered in the works of art. Therefore, an entirely new approach utilising the pattern of sugars obtained on the hydrolysis of these gums, which are polysaccarides, was developed. A thin layer chromatographic method for the separation of hydrolysed products was developed and standardised. Final confirmation was done with the help of infra-red spectrometry by comparing them with the standard infra-red spectra, also generated in the laboratory. The work on standardizing the hydrolysis procedure for gum arabic, *ghatti, karaya,* mesquite, tragaicanth are being carried out.

XI. ARCHAEOLOGICAL GARDENS[1]

DELHI

1. HUMAYUN TOMB'S NURSERY, NEW DELHI.—Sprinkler system of irrigation was introduced. Ornamental plants are being developed in the nursery.

New nurseries are being developed at the gardens at Purana Qila, Qutb Minar, Red Fort and Safdarjung tomb.

2. VIJAY MANDAL, NEW DELHI.—A garden was laid out around the monument. Several varieties of ornamental plants were planted.

GUJARAT

3. SUN TEMPLE, MODHERA, DISTRICT MEHSANA.—The land around the Sun temple was developed and different types of plants were planted. One 20 H.P. motor-pump was installed in the recently-excavated bore well to irrigate the garden around the temple.

4. SHAHAR-KI-MASJID, PAVAGADH, DISTRICT PANCH MAHALS.—A bore-well was excavated and a motor-pump was installed to meet water requirements for the garden around the monument.

HIMACHAL PRADESH

5. BAUNATH TEMPLE, BAUNATH, DISTRICT KANGRA.—A nursery is being developed to raise different types of seasonal plants.

JAMMU AND KASHMIR

6. SUN TEMPLE, MARTAND, DISTRICT ANANTNAG.—An extensive garden, covering an area of 16 hectares was developed around the temple. Seasonal flowers, roses, etc., were planted in the front part and different types of orchards were planted on the back side of the temple.

7. STUPA, PARIHASAPURA, DISTRICT BARAMULA.— A garden was laid out around the monuments. Different types of plants were planted in order to beautify the garden.

8. AVANTIPUR TEMPLE-COMPLEX, AVANTIPURA, DISTRICT PULWAMA.—The garden was maintained properly.

MADHYA PRADESH

9. BURHANPUR FORT, BURHANPUR, DISTRICT KHANDWA.—A proper pipe-line was laid and a motor-pump was installed to irrigate the garden by lifting water from the Tapti river.

RAJASTHAN

10. CHITTAURGARH FORT, DISTRICT CHITTAURGARH.—Some new plantation was done at the garden inside the fort.

[1]Information from Horticulture Division No. II of the Survey.

XII. PUBLICATIONS

PUBLICATIONS OF THE SURVEY

1. INDIAN ARCHAEOLOGY—A REVIEW.—The issue for the year 1985-86 was in the advanced stage of printing and the issue for 1986-87 was made press ready.

2. ANNUAL REPORT ON INDIAN EPIGRAPHY.—The issue for the year 1980-81 was brought out and the subject index to the issues from 1887 to 1972 was published too. Besides, list of inscriptions copied by the Epigraphy Branch was brought out.

3. EPIGRAPHIA INDICA.—Volume XLI was published

4. SOUTH INDIAN INSCRIPTIONS.—Volumes XVI-XVII and XIX were published.

5. MEMOIRS OF THE ARCHAEOLOGICAL SURVEY OF INDIA.—The report on *Excavation at Surkotada and Exploration in Kutch* as Memoir No.87 was in the advanced stage of printing.

6. ARCHITECTURAL SURVEY OF TEMPLE SERIES.—Numbers 4 and 5 *Temples of Pratihara period in Central India* and *Temples of Khajuraho* respectively were in the advanced stage of printing.

7. PICTURE POSTCARDS.—Ten sets of coloured picture postcards which include monuments in Agra, Ajanta, Belur, Delhi, Ellora, Gujarat, Halebid, Khajuraho, Nalanda and Sanchi were printed.

OTHER PUBLICATIONS

ANDHRA PRADESH.— The Department of Archaeology and Museums, Government of Andhra Pradesh, brought out the following publications during the year under review, (a) *Amaravati Krotha Satavahana Silpalu,* (b) *Victoria Jubilee Museum Souvenir* and, (c) *Swatantra Samaramula Andhra Mahilalu.*

GUJARAT.—The Department of Archaeology, Government of Gujarat, brought out a folder on the excavations carried out at Shikarpur during the year under review.

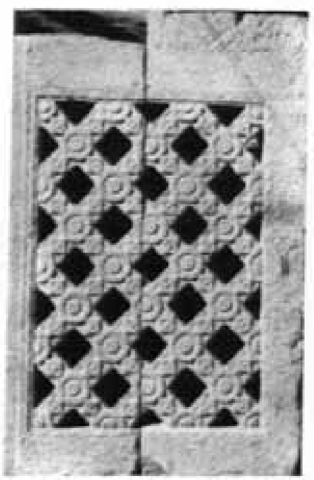
MADHYA PRADESH.—The State Archaeology and Museums, Government of Madhya Pradesh, brought out the following publications during the year under review, (a) *Puratan-6,* (b) *Dangwada Excavations,* and (c) a folder on Lai Bagh. Besides a folder on Saiva images under display in Bhopal Museum and posters on important Saiva images were also brought out.

MANIPUR.—The State Archaeology, Government of Manipur, brought out a brochure *Archaeology of Manipur* during the year under review.



A B C

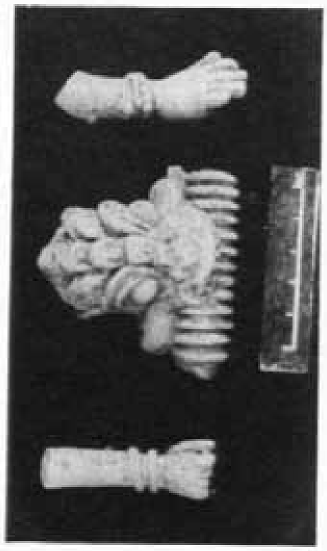
Ambari: image of, A, *Surya;* B, *Vishnu;* C, *Mahishasuramardini. See p. 6*



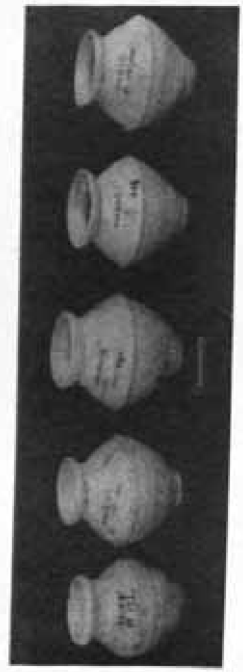
A



B

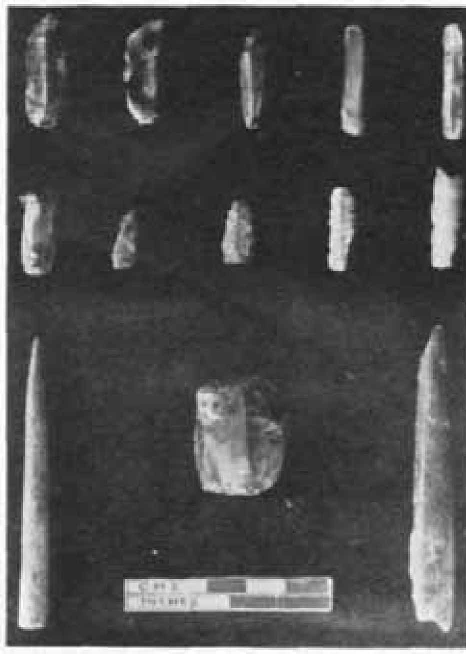


C

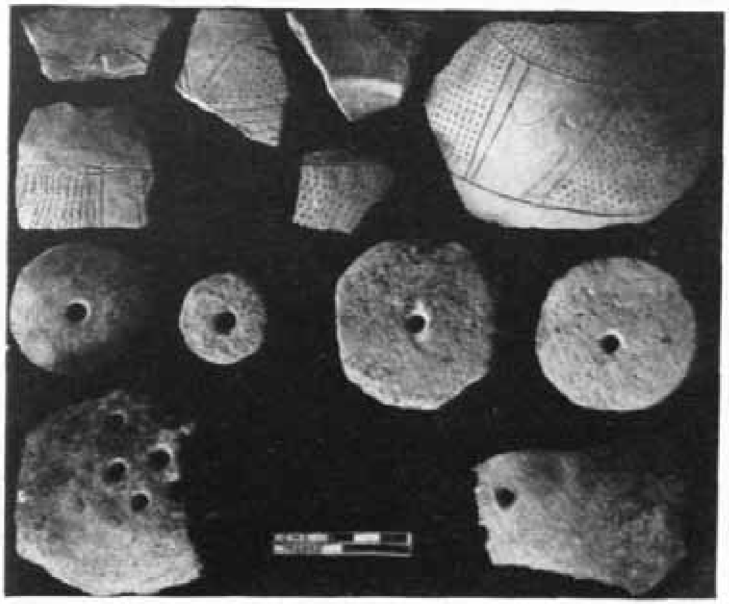


D

Ambari: A, *lattice of basalt;* B *and* C, *fragmentary terracotta figurines;* D, *lotas.* *See p. 6*



A



B

Maner: A, *microliths;* B, *terracotta objects and pottery. See p. 8*



A

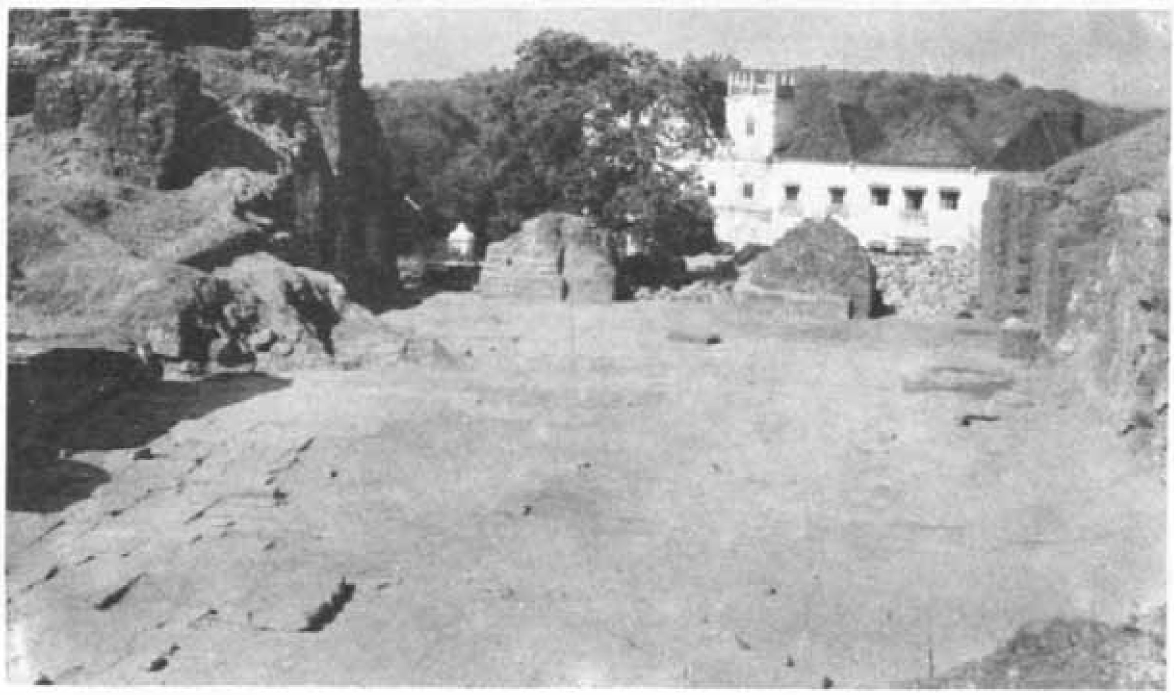


B

Raja Vishal-Ka Gah: A, circular well and other excavated structures; B, circular well in a house complex. *See p. 9*



A



B

Old Goa, St. Augustine Church: central nave, A, *before and* B, *after excavations. See p. 9*



A



B

Old Goa, St. Augustine Church: side chapels. A, *before and* B, *after excavations. See p. 9*



Harsh-Ka-Tila, Thanesar: exposed rain gully showing habitational deposits and structures from Kushana to late Mughal periods. *See p. 21*



A



B

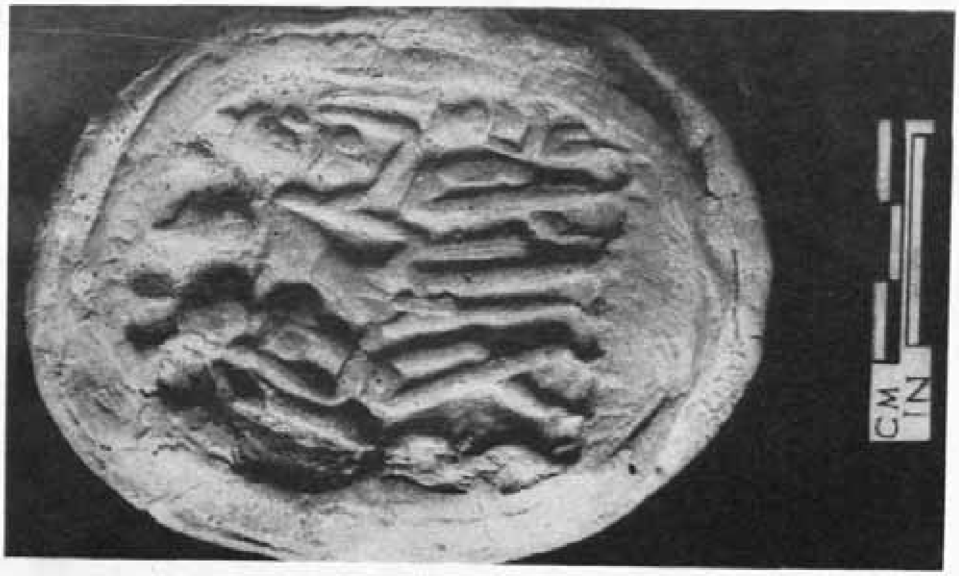


D

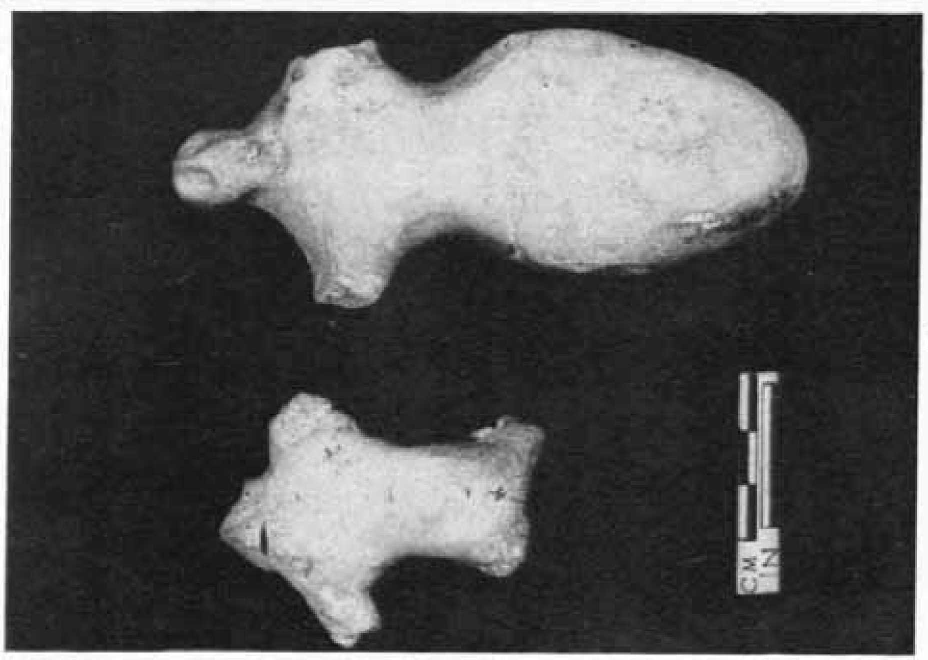


C

Harsh-Ka-Tila, Thanesar: A, *lid with trinagular perforations and a figure of couchant lion*; B, *elephant*; C, *ram*; D, *male figure, all of terracotta. See pp. 22-23*

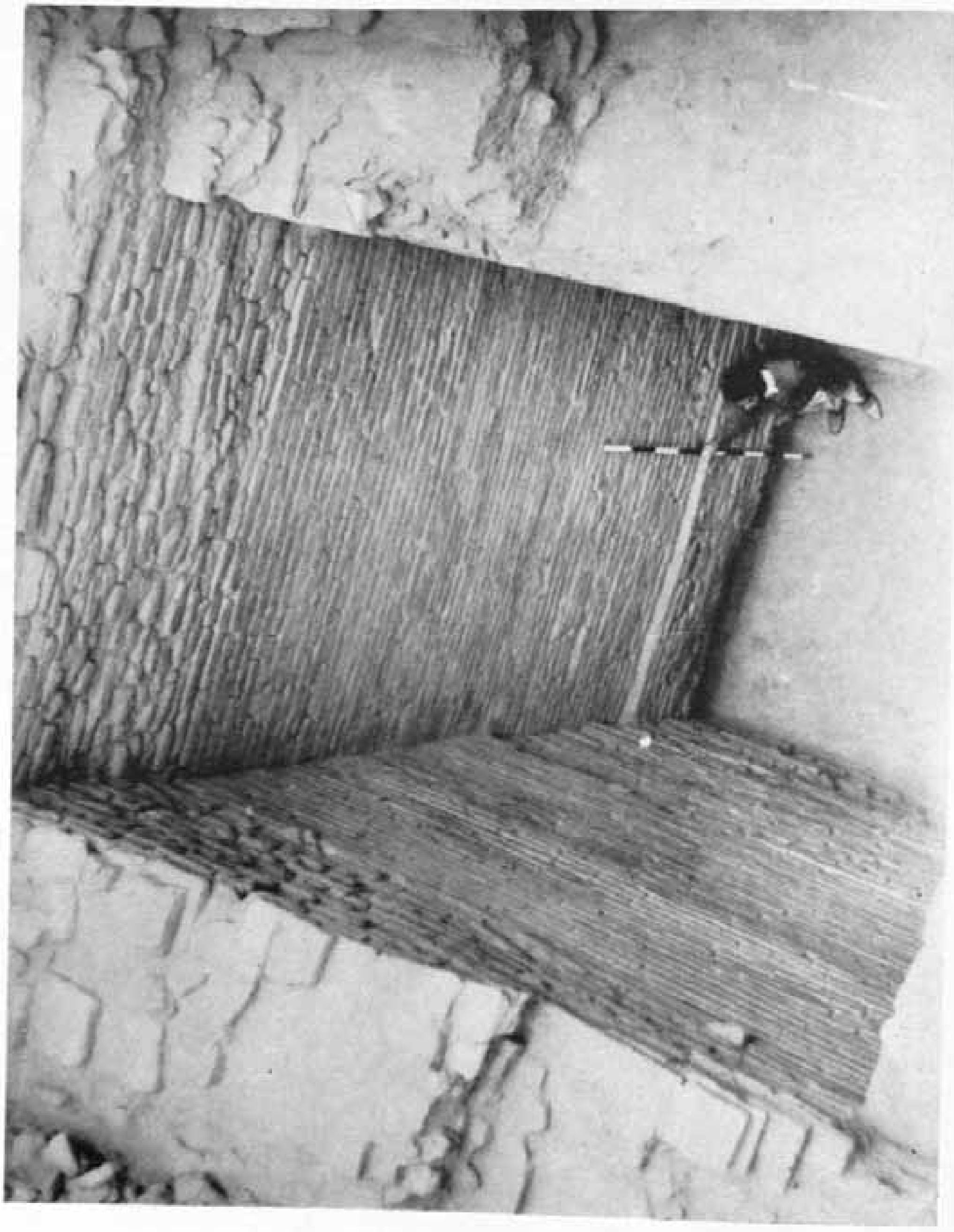


B

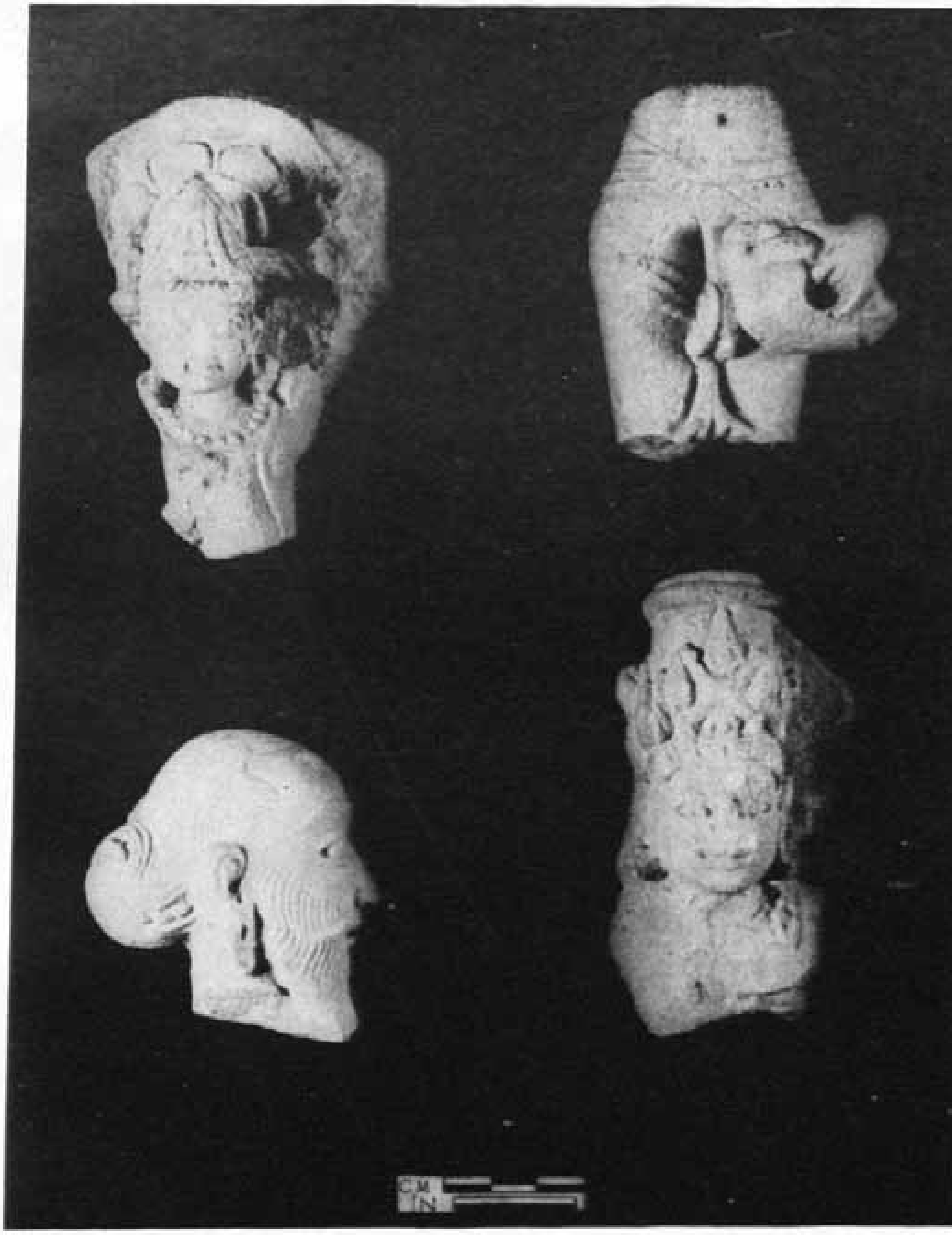


A

Harsh-Ka-Tila, Thanesar: terracotta, A, *anthropomorphic figures and* B, *plaque.* *See p. 22*



Harsh-Ka-Tila, Thanesar; partially exposed structure, Vardhana period. *See p. 22*



Harsh-Ka-Tila, Thanesar: stone sculptures, Rajput period. *See p. 22*

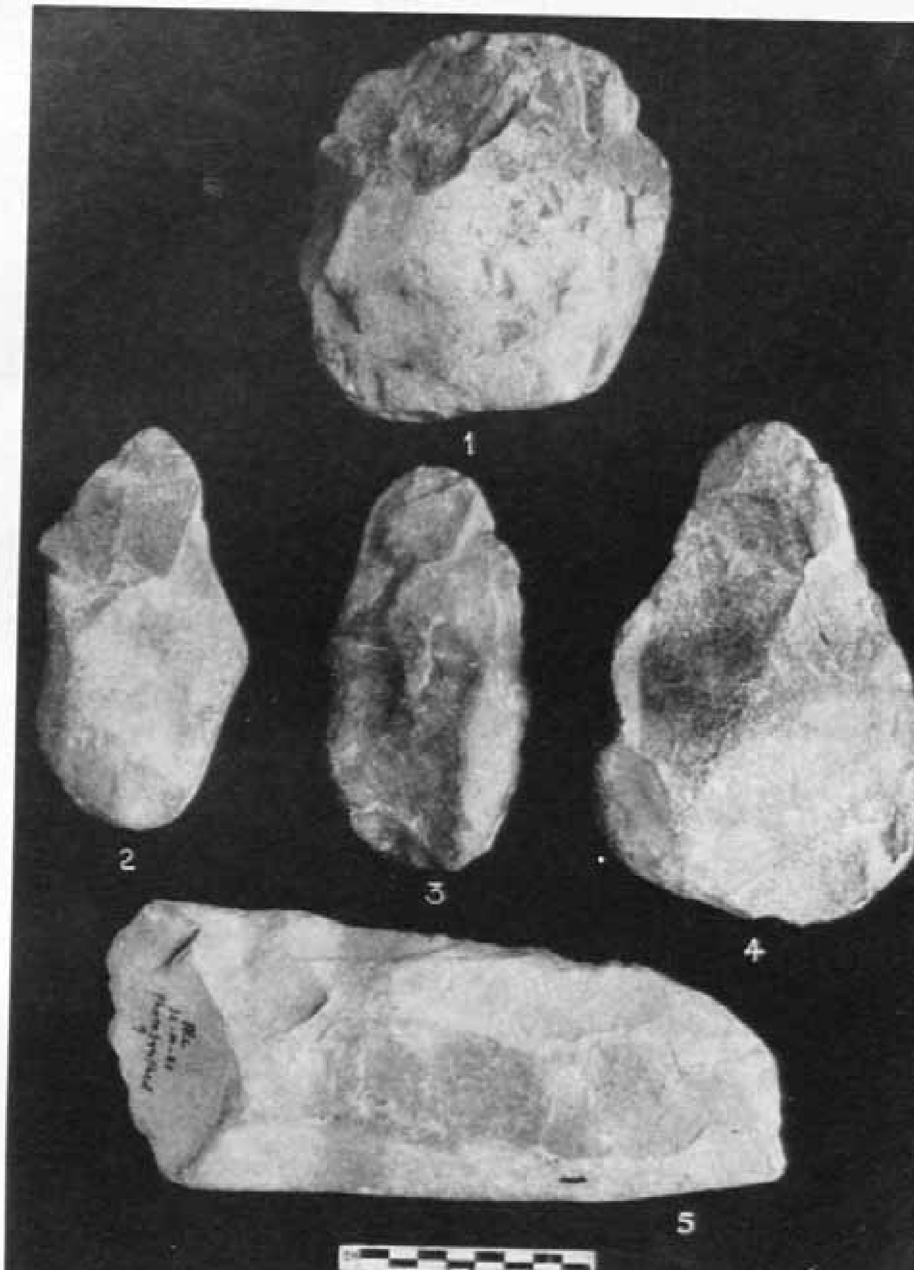


A



B

Harsh-Ka-Tila, Thanesar: exposed structures. See pp. 23-24



Alchi: *stone artefacts*, 1, *unifacial chopper*; 2-4, *handaxes*; 5, *retouched block*. *See p. 28*

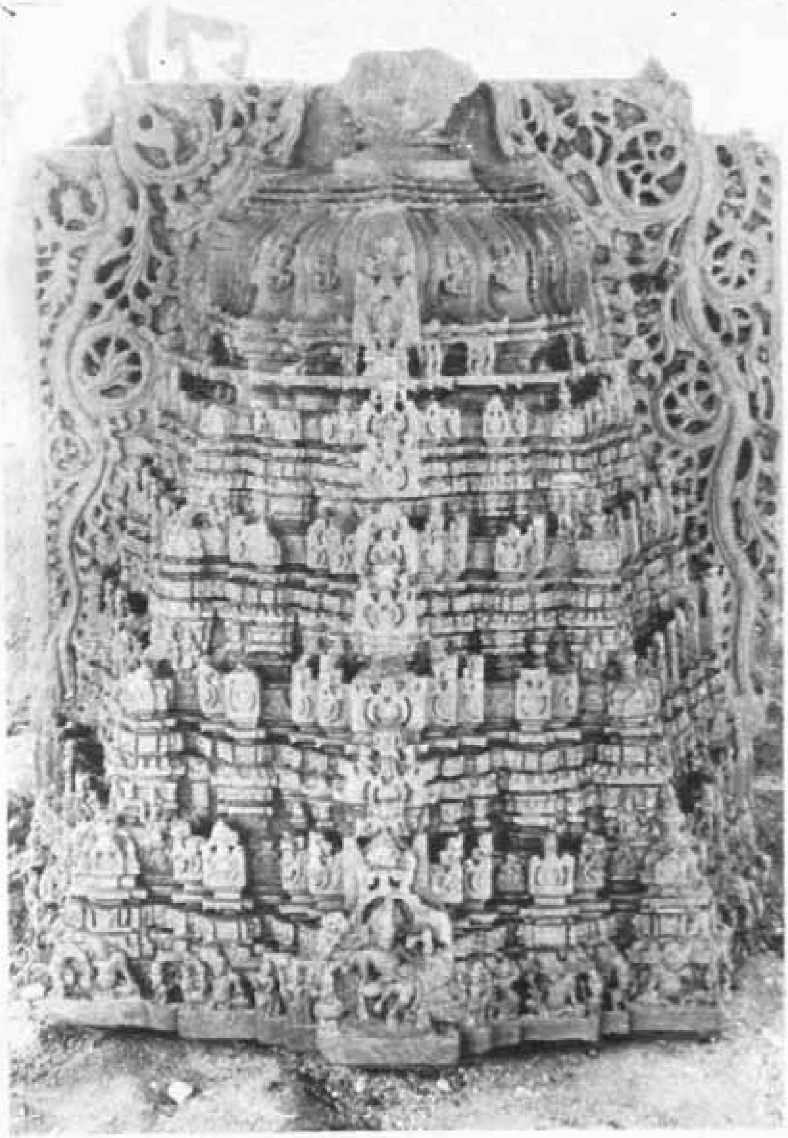


A



B

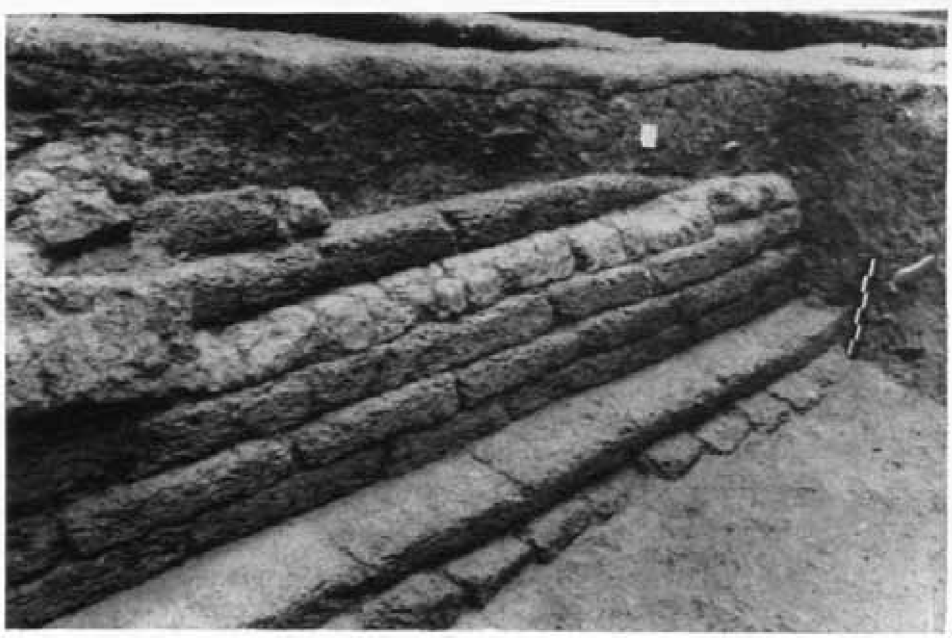
Hampi: exposed structure, A, west of King's audience hall; B, between King's audience hall and Hazara Ramachandra temple. *See p. 31*



Hampi: model of vesara sikhara, west of king's audience hall. See p. 31

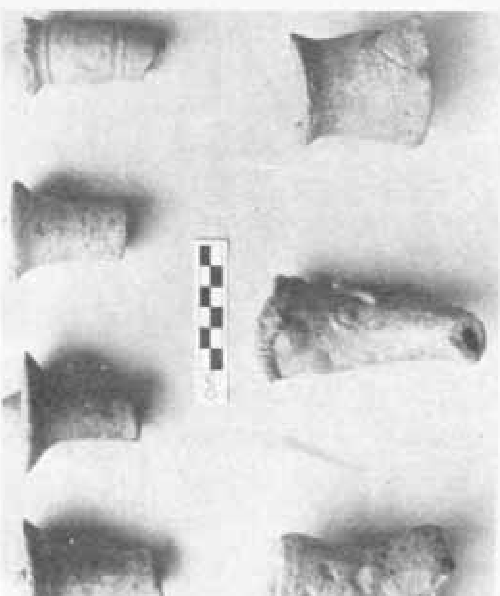


A



B

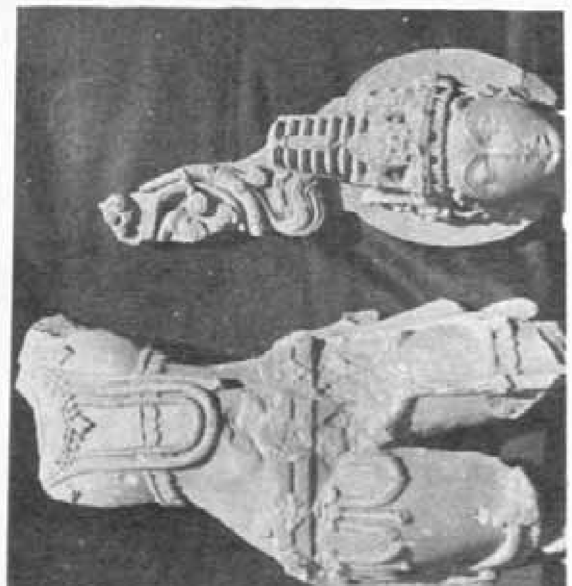
Gudnapur: A, *view of eastern periphery of the mound and* B, *wall with offsets. See p. 37*



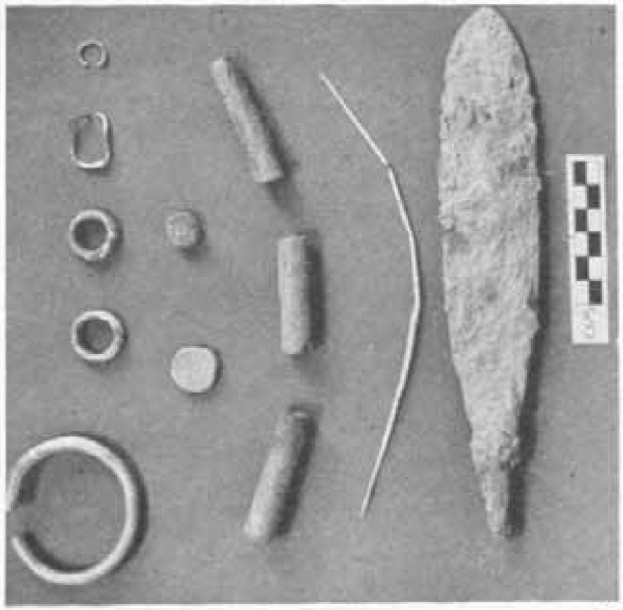
A



B

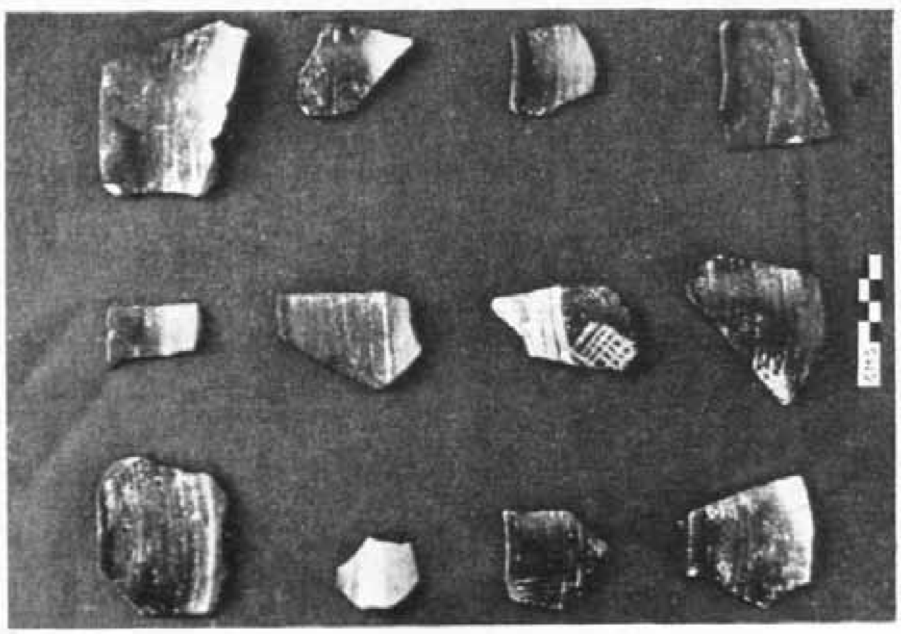


C

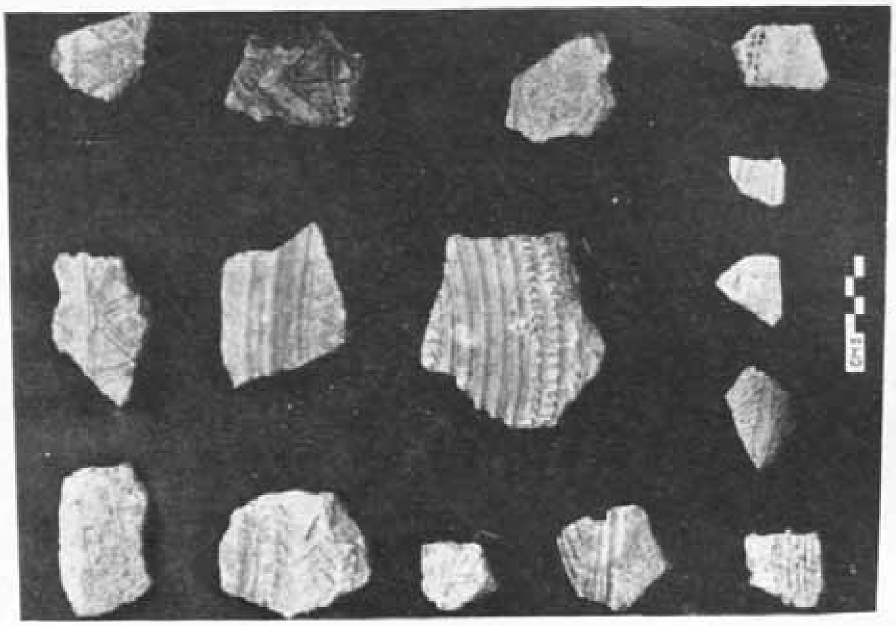


D

Gudnapur: A, sprinklers; B, celadon pot; C, torso and head of Jain yaksha; D, metal objects. *See p. 39*

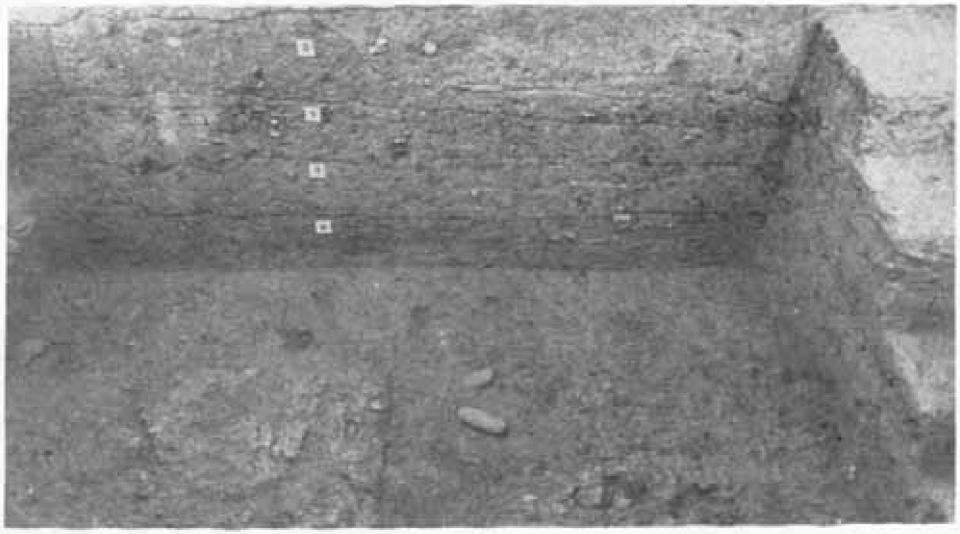


A

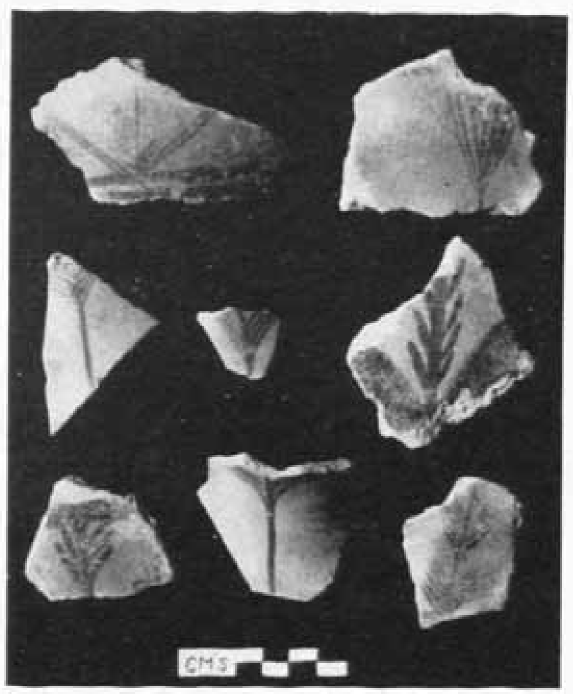


B

Kotra: Painted pottery. See p. 40

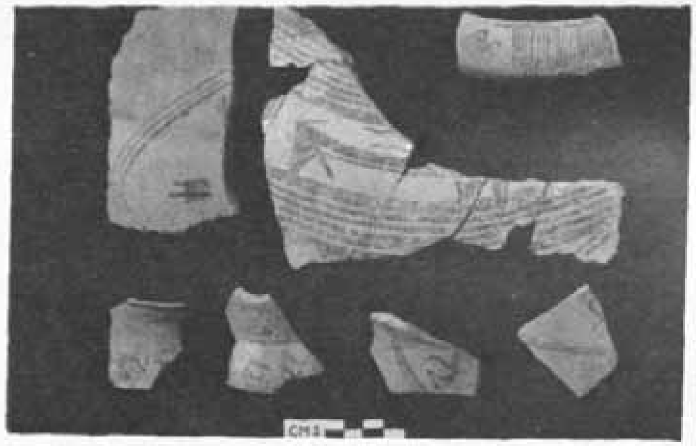


A



B

Kotra: A, *exposed structures, Period IA*; B, *painted pottery. See pp. 40-41*

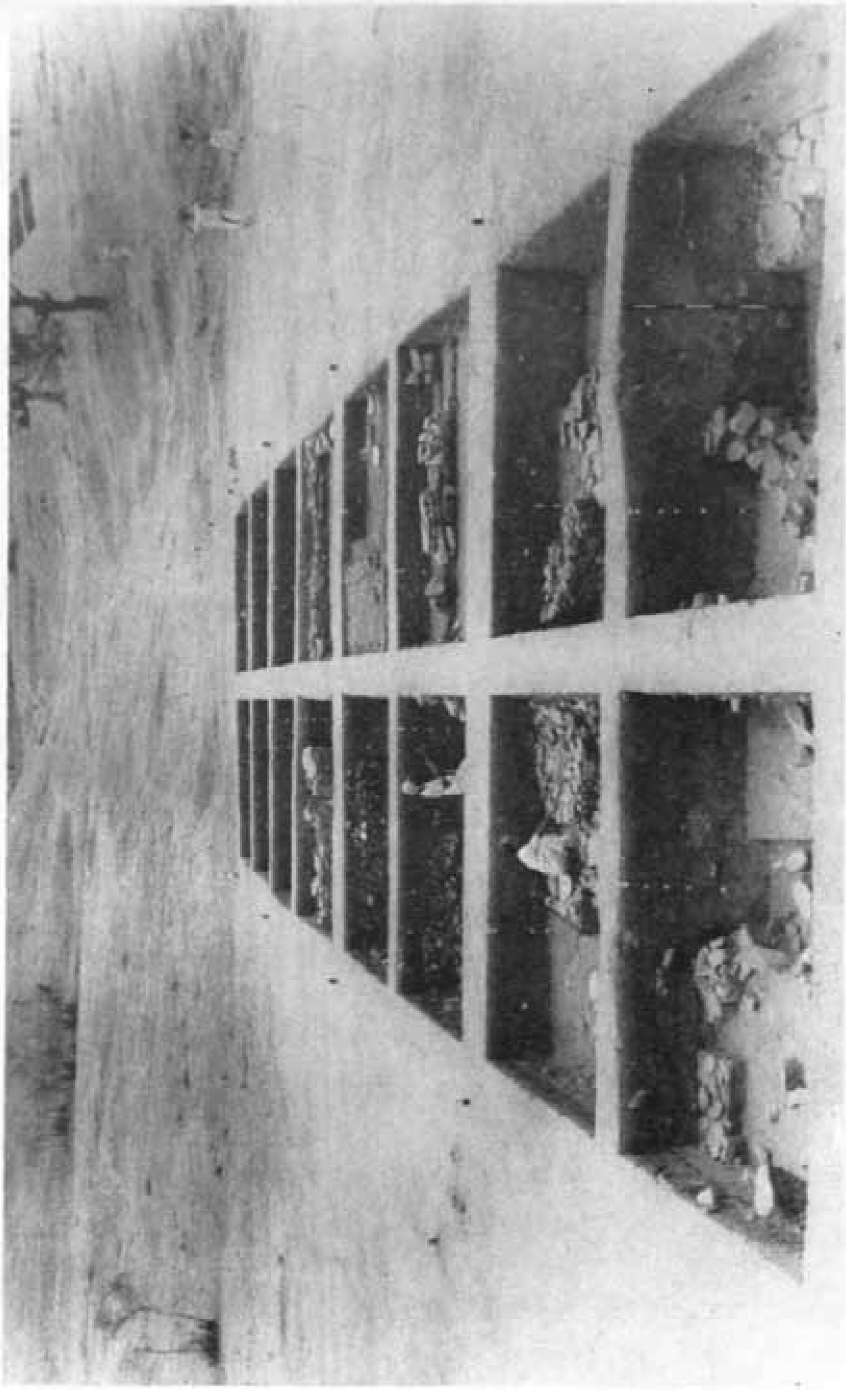


A

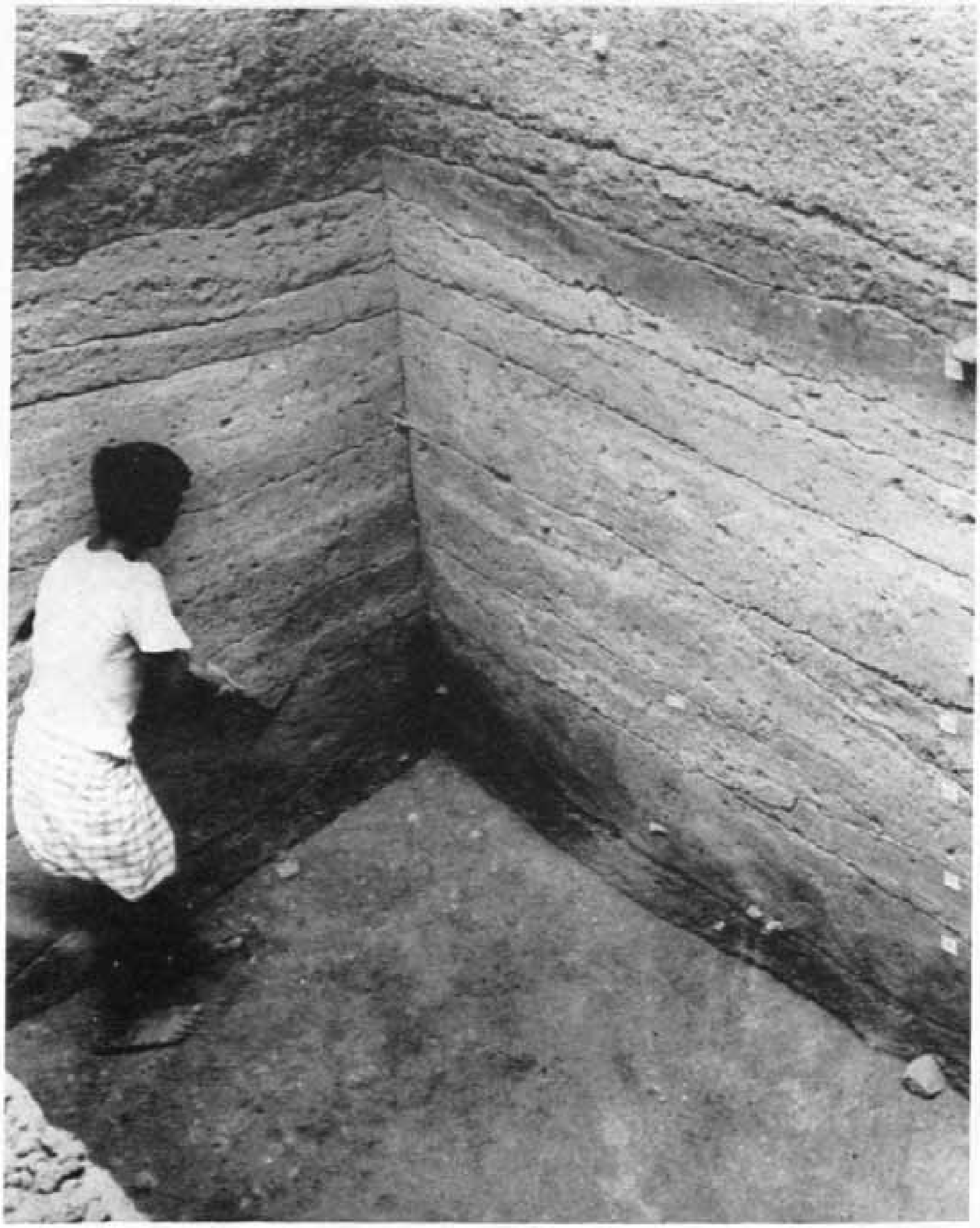


B

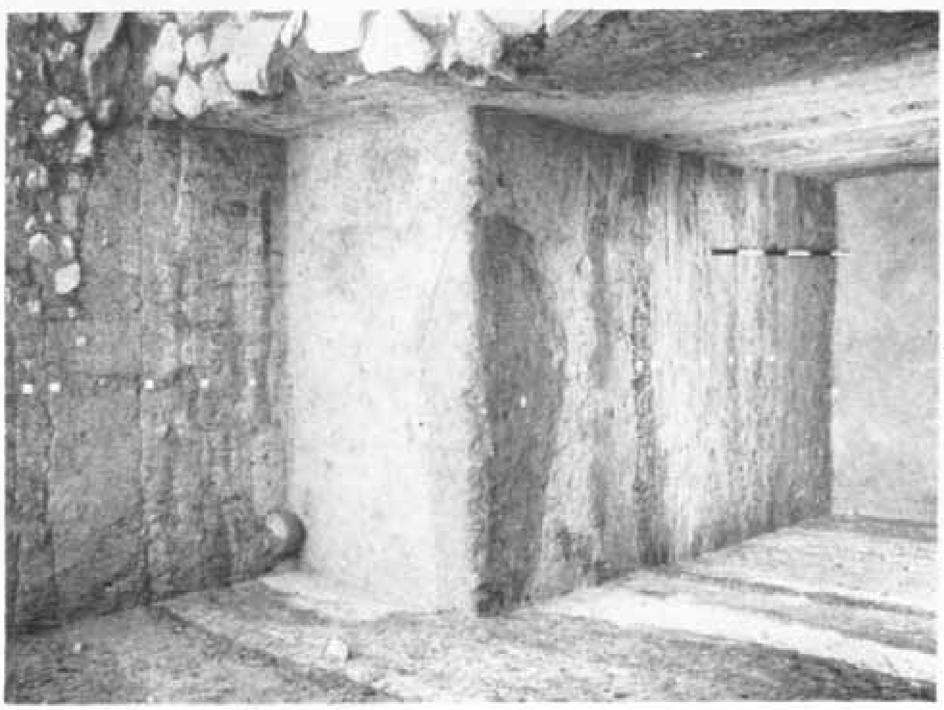
Kotra: decorated pottery, Period II. See p. 41



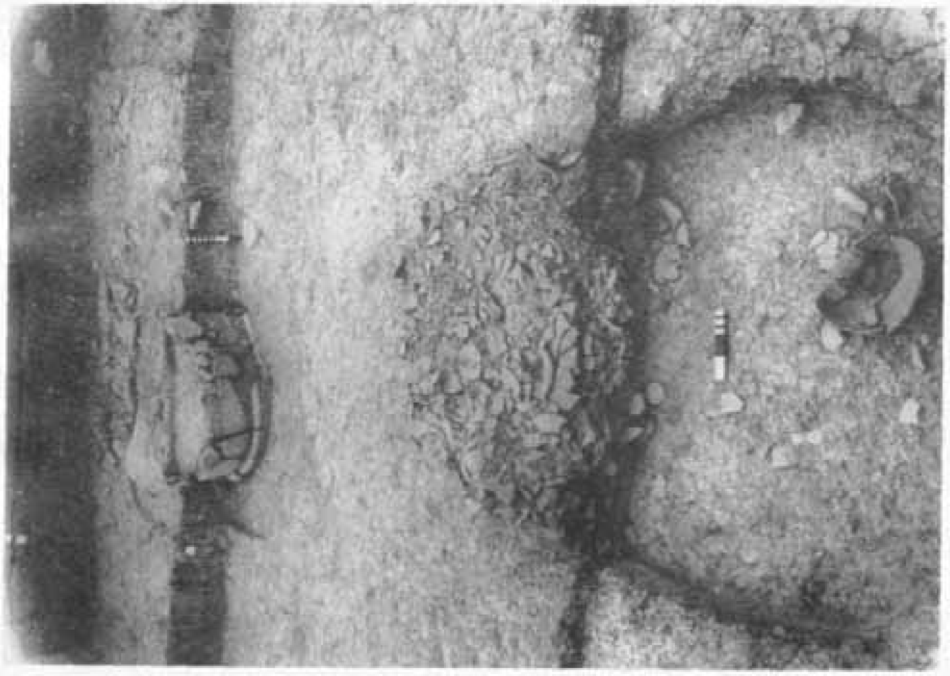
Adam: view of cuttings inside the fortification. *See p. 50*



Adam: pre-defence microlithic level. See p. 50

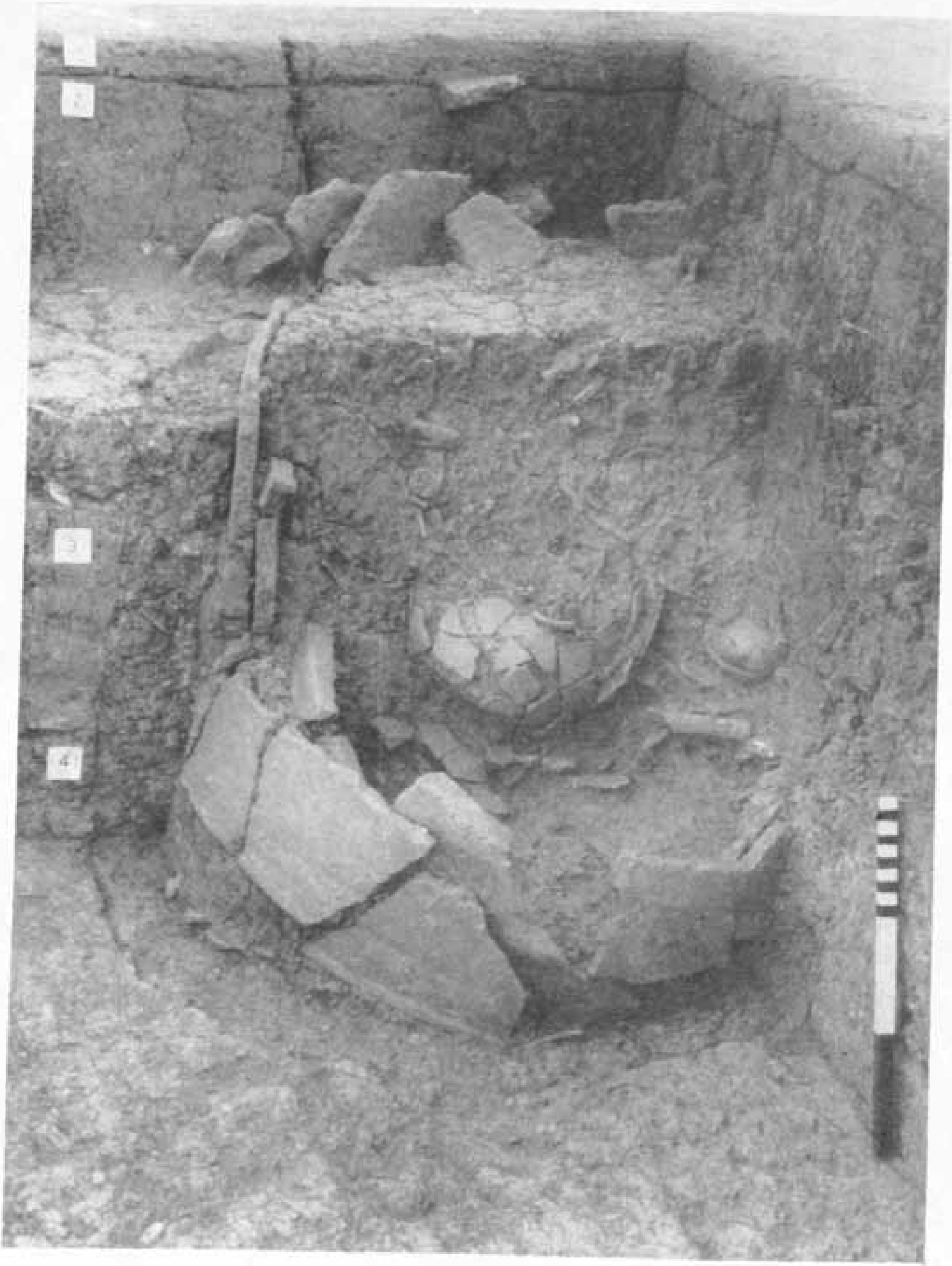


A

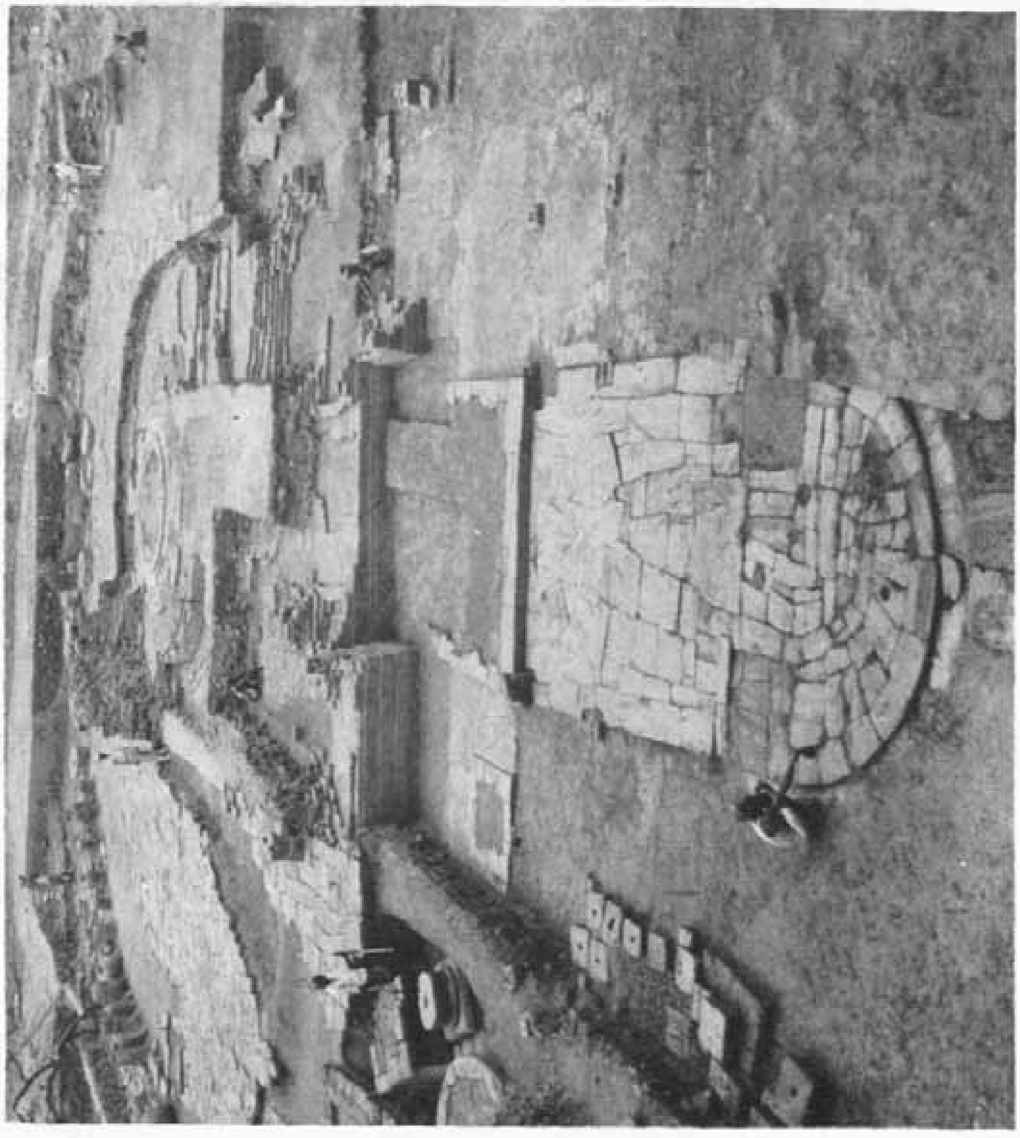


B

Adam: A, cuttings with pot-burial, Period III ; B, burial with battered potsherds. *See pp. 53 and 59*



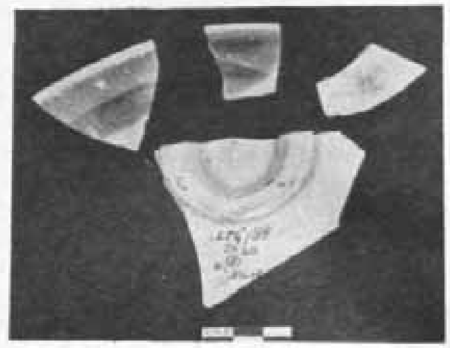
Adam: ring burial. *See p. 59*



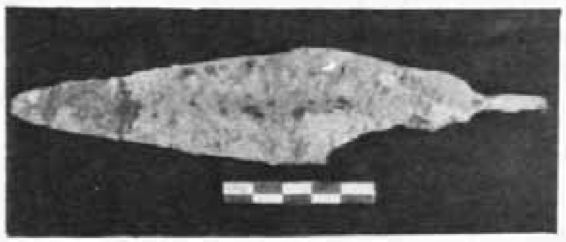
Lalitagiri: exposed structures. *See p. 65*



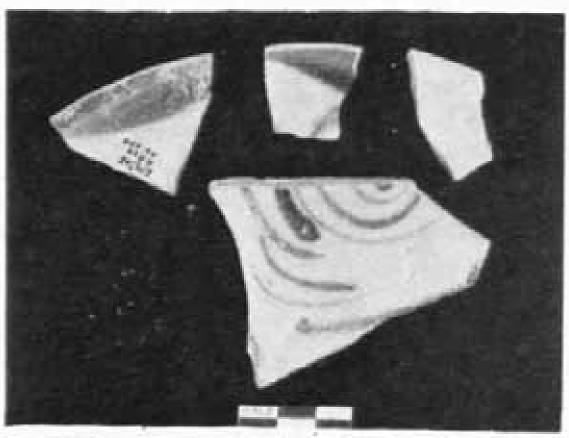
A



D



B



C



E

Lalitagiri: A, *iron sickle*; B, *spearhead*; C *and* D, *painted China-clay-pottery*; E, *terracotta plaque showing Buddha*.

See p. 66



A



B

Udayagiri: A, *view from north showing enclosure walls of phase I to IV and the gateway complex*; B, *exposed central platform, pradakshinapatha, enclosure wall and pits capped with dressed stone blocks.* *See pp.67-68*

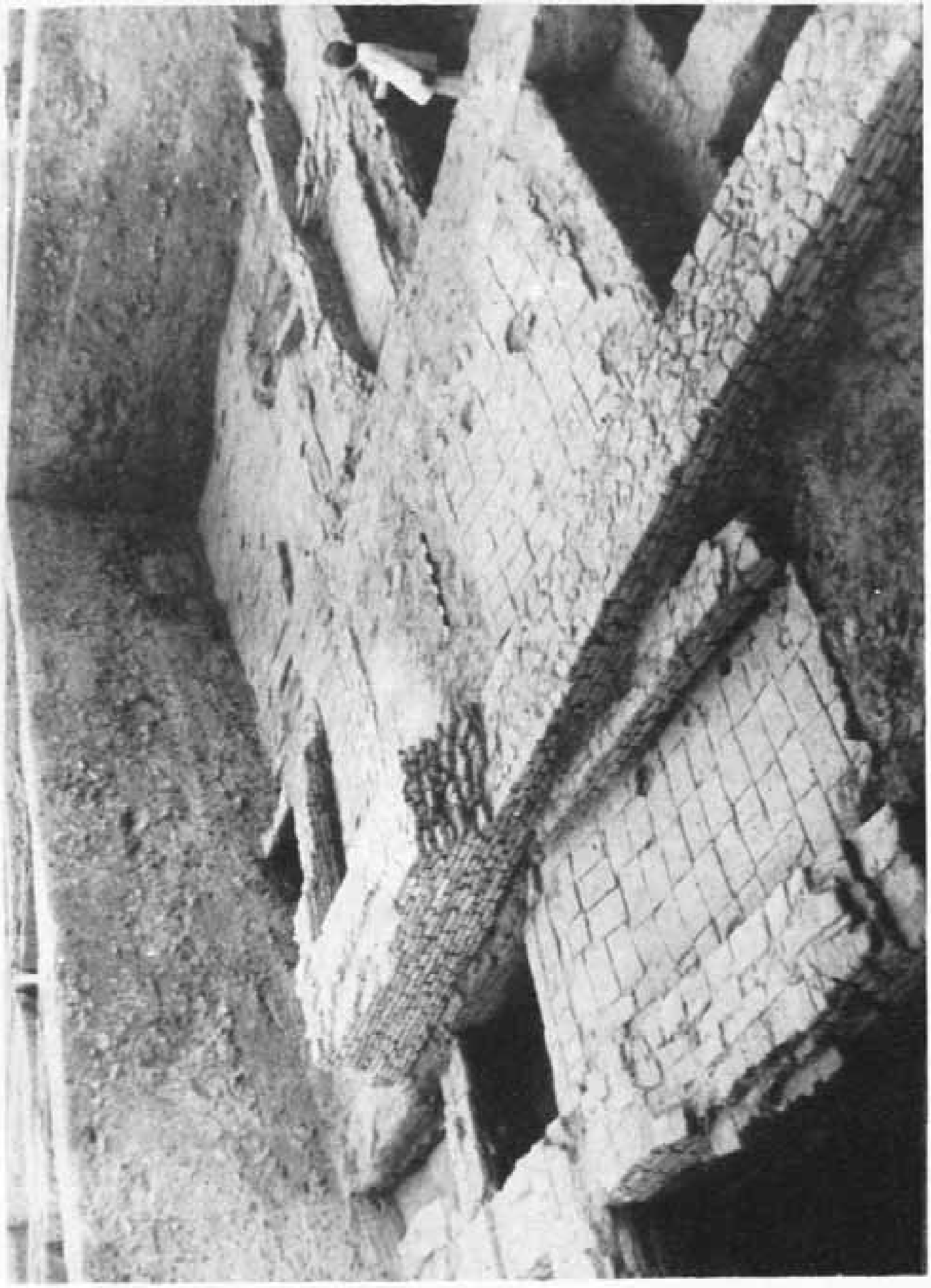


A

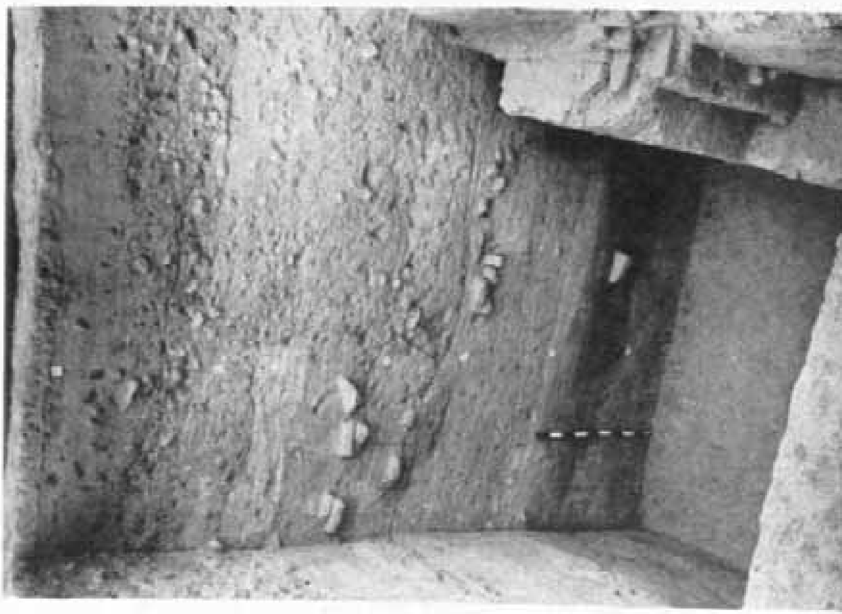


B

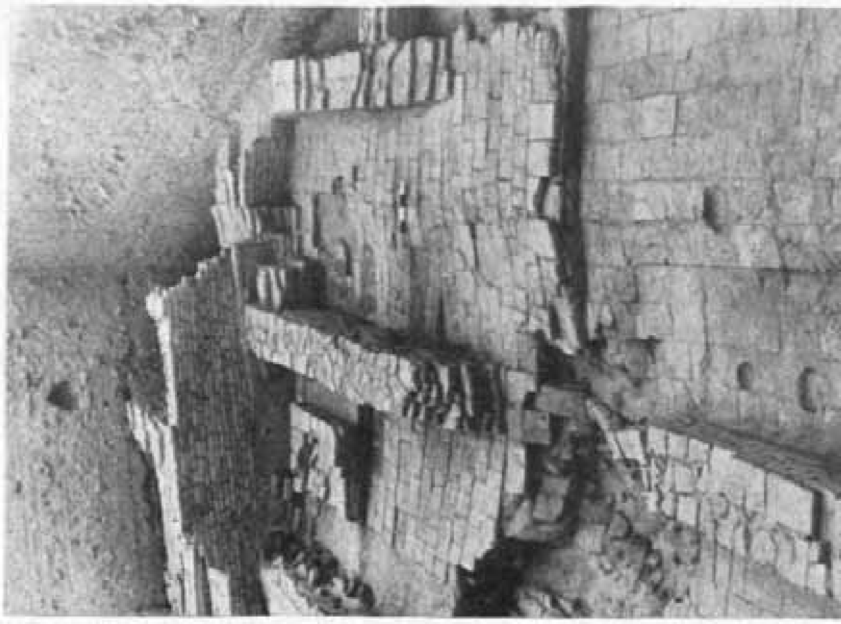
Udayagiri: A, *view of the gateway and enclosure walls of phase II, III and IV from north*; B, *kitchen and bathroom block, phase I*. *See pp. 67-68*



Sanghol: general view of the palace complex. See p. 69

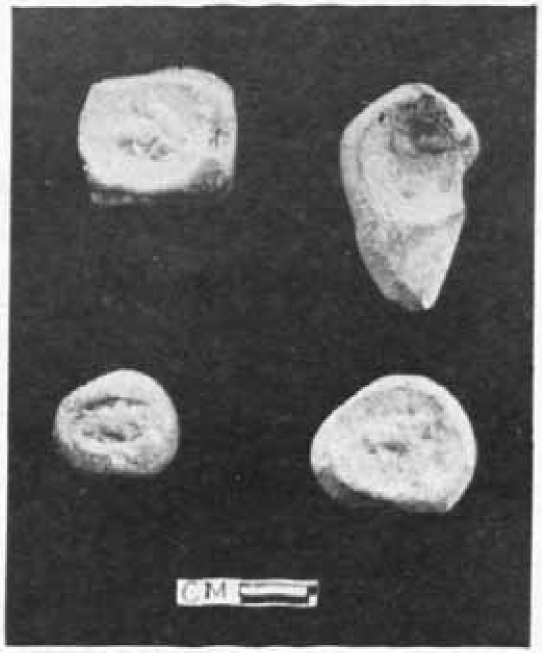


A

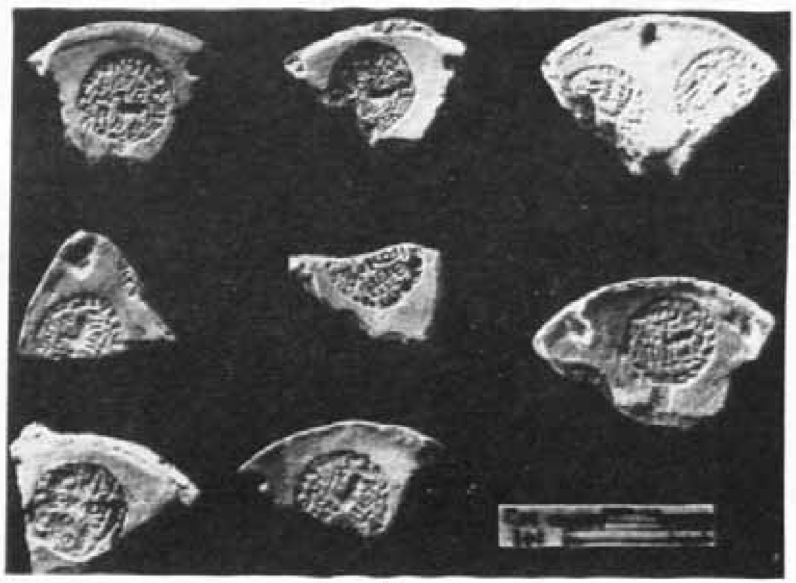


B

Sanghol: palace complex, A, *details of stratigraphy and* B, *pathways. See pp. 69 and 71*

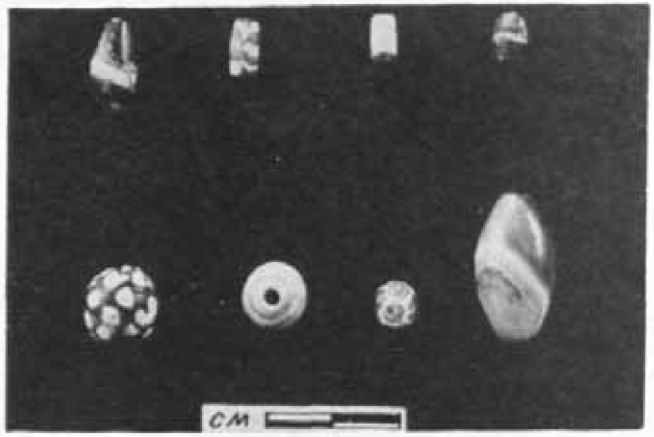


A



B

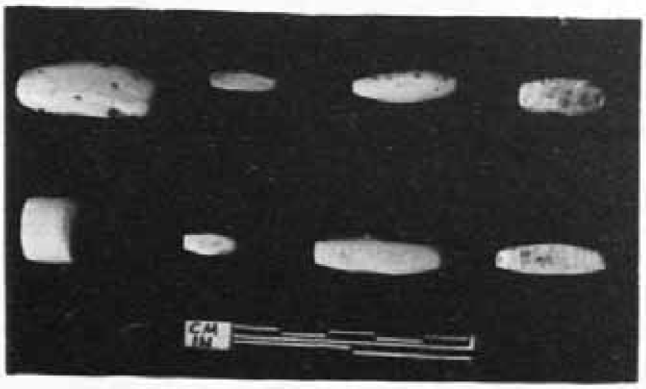
Sanghol: A, *terracotta sealing*; B, *coin moulds of Kunindas*. *See p. 72*



A

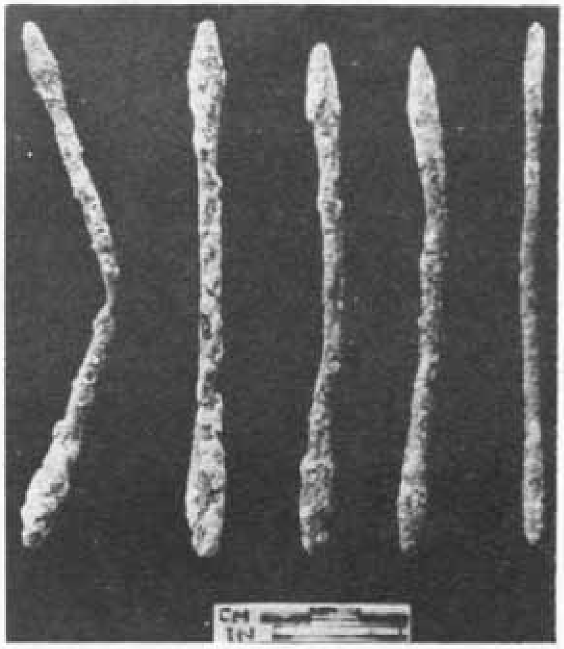


B



C

Sanghol: beads of, A *and* B, *semiprecious stone*; C, *shell.* *See p. 72*

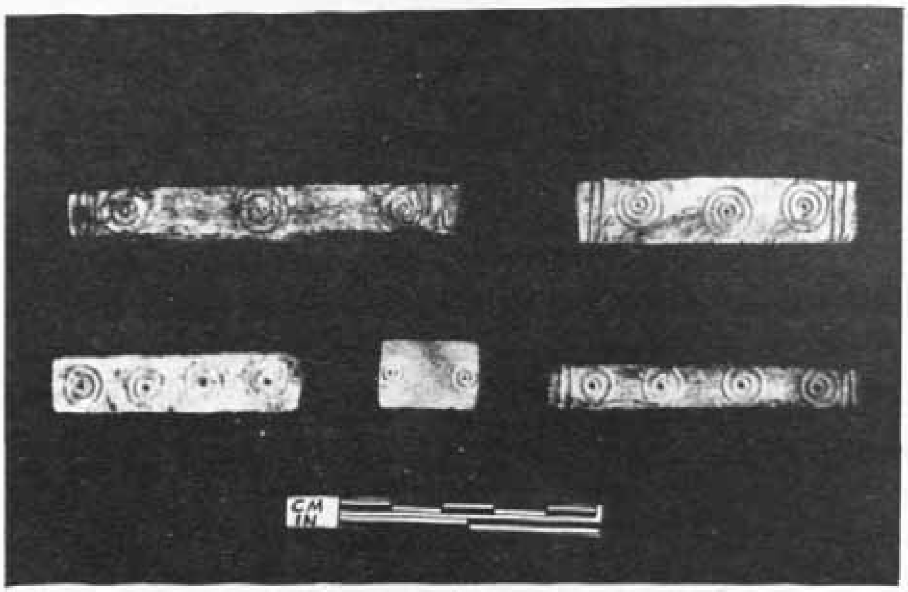


A

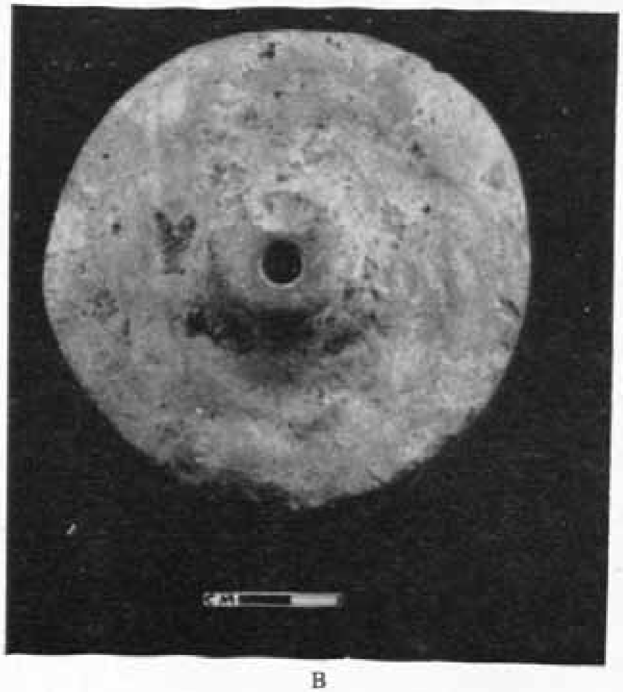


B

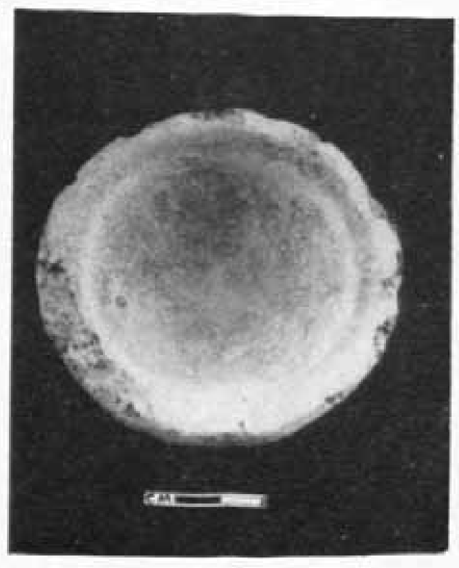
Sanghol: A, *copper antimony rods*; B, *bone points*. *See p. 72*



A

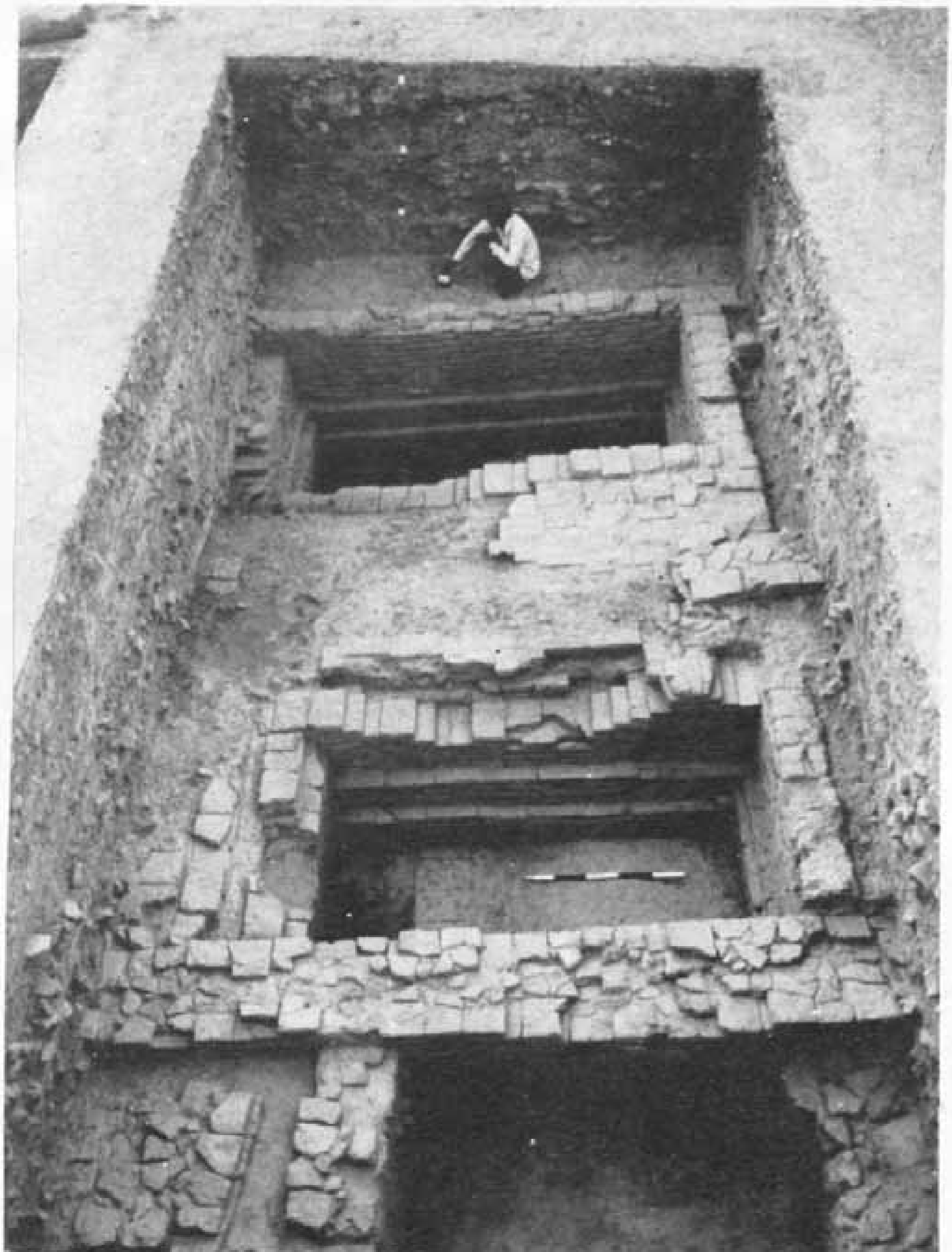


B

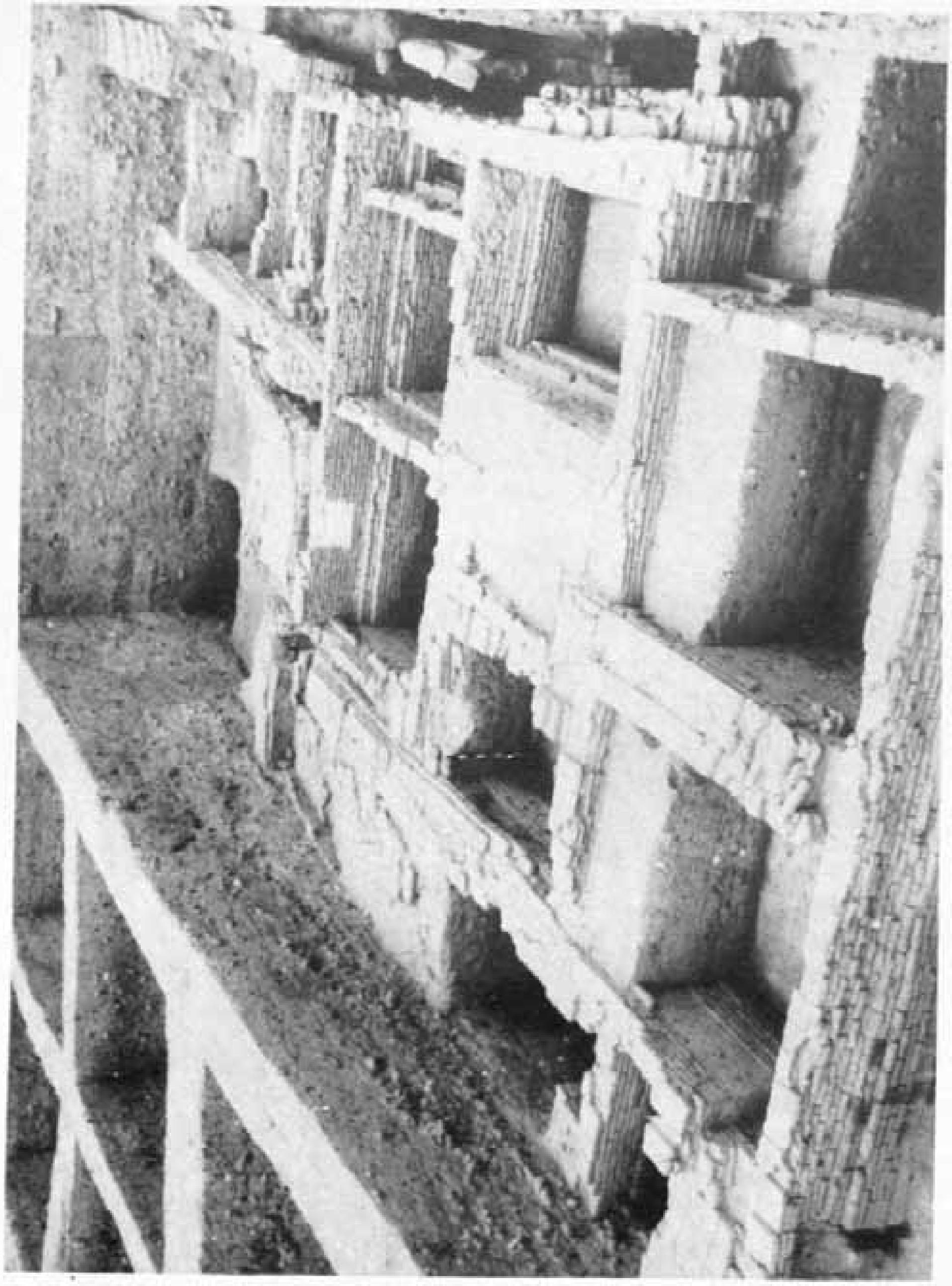


C

Sanghol: A, *dice of ivory and bone*; B, *terracotta cart-wheel*; C, *terracotta crucible*. *See p. 72*



Sanghol: religious complex, details of platform with brick structures. *See p. 72*



Sanghol: exposed religious complex. *See p. 72*



Sanghol: religious complex, details of additions and alterations in later periods. See p. 73



Sanghol: religious complex, details of skeletal remain, horse or bull? See p. 73



A

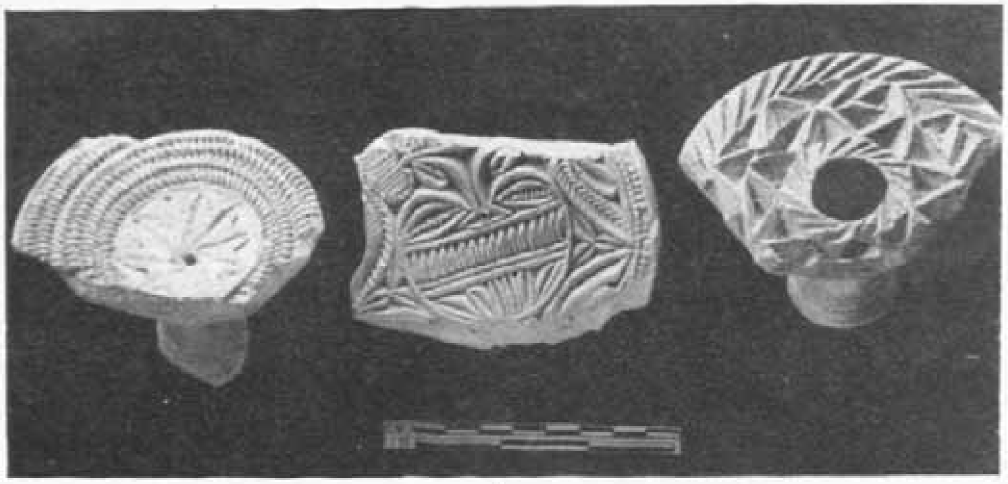


B

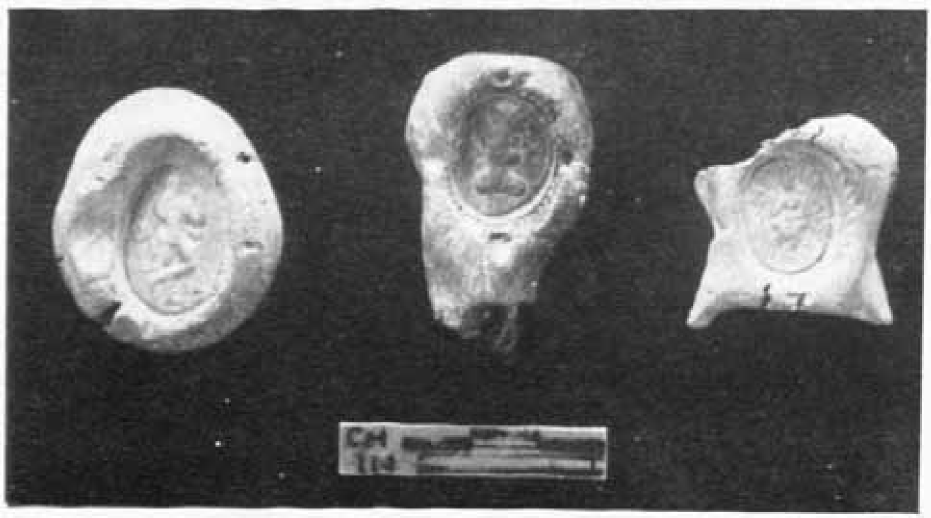


C

Sanghol: A, *copper coin*; B, *terracotta mould of female figurine*, C, *gold coin of Samundragupta*. *See p. 73*

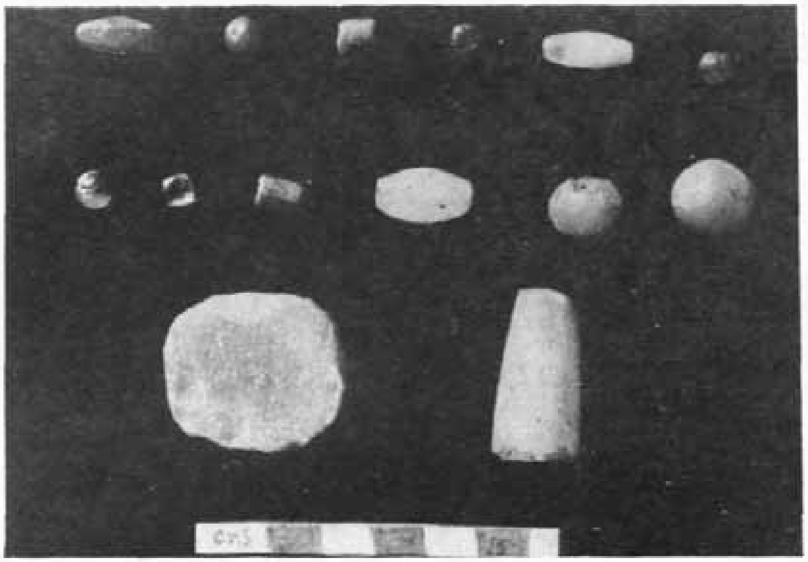


A

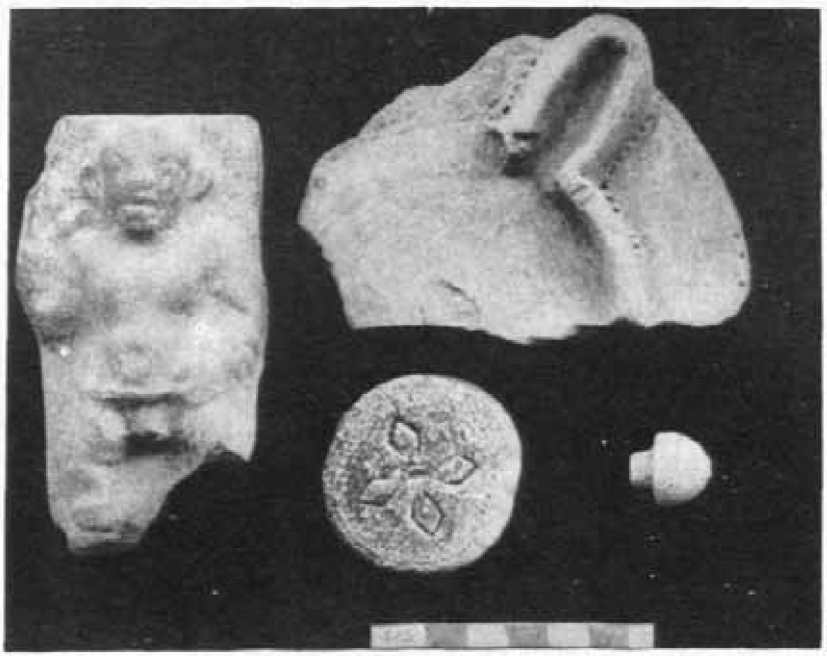


B

Sanghol: terracotta, A, *textile stamps and* B, *seals and sealings.* *See p. 73*



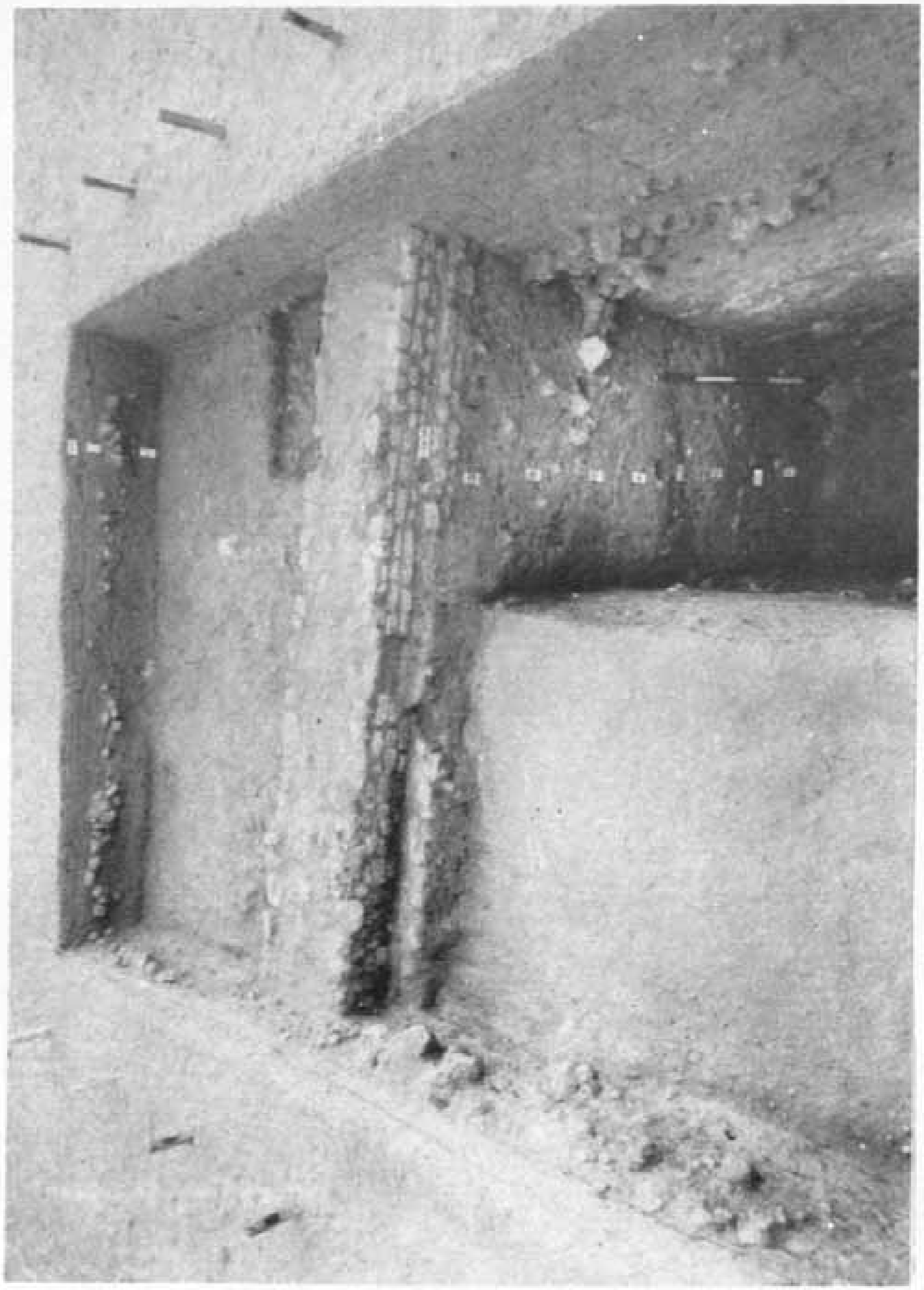
A



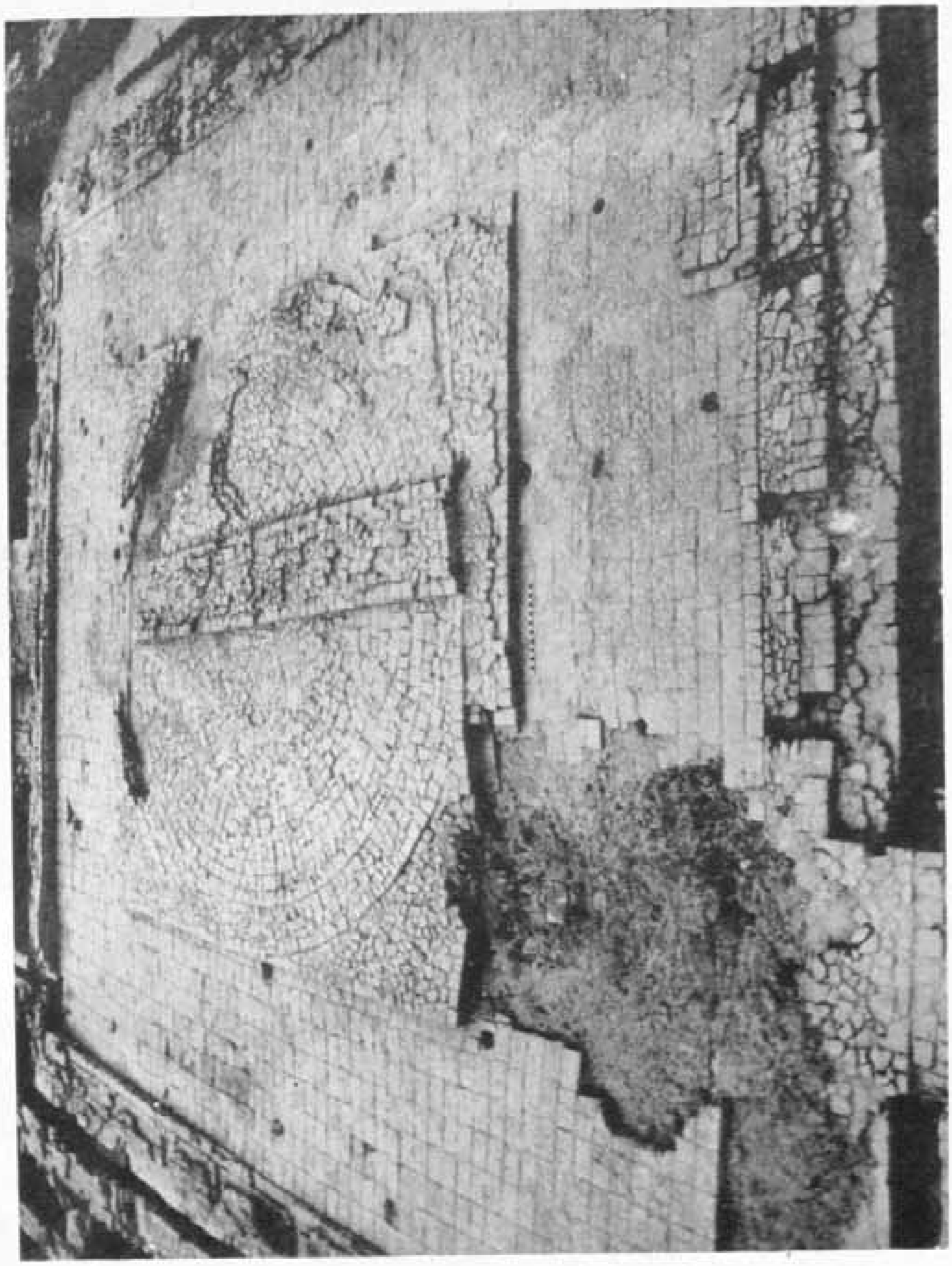
B

Kudikadu: A, *beads and gamesmen of semiprecious stones*; B, *terracotta objects*.

See p. 80



Kudikadu: exposed structures, KDU-2. *See p. 80*



Sravasti: partly exposed central rib of the stupa. *See p. 82*



Sravasti: partially exposed tank oriented east-west of monastic complex. *See p. 82*



A



B

Sravasti: A, *exposed votive stupas*; B, *structural activities of Kushana, Gupta and later Guptas and Gahadavala periods. See p. 83*

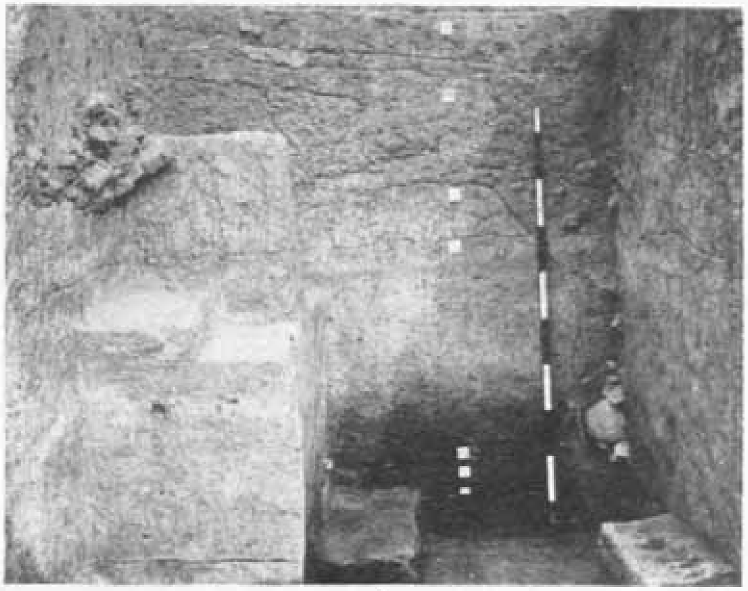


A



B

Purola: A, *Painted Grey Ware sherds*; B, *Vedic brick altar*. *See pp. 88-89*

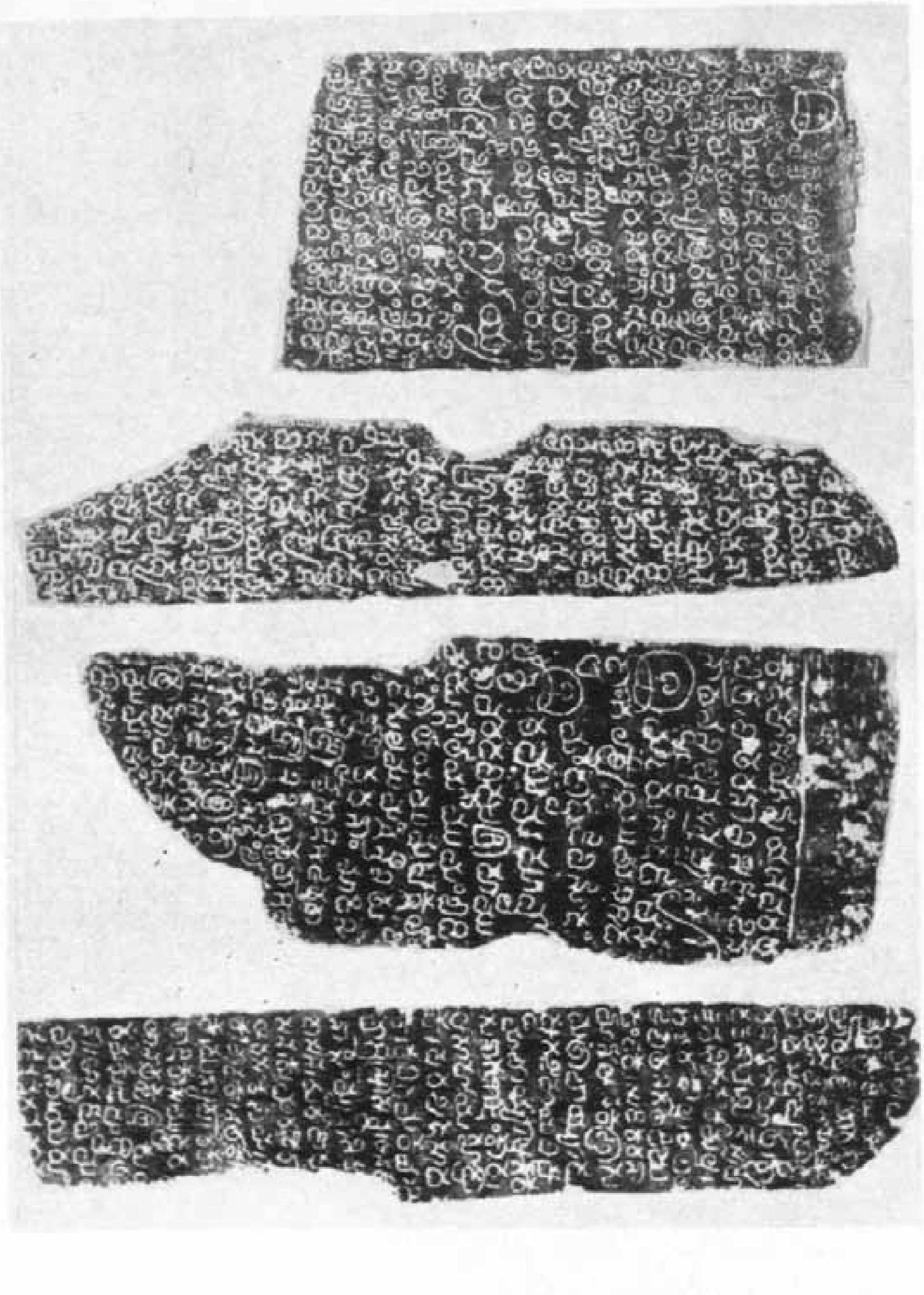


A



B

Mangalkot: A, *view of the eastern section, Trench* A *1* (*MGKT-2*), B, *view of excavated trenches at Kachharidanga*. *See pp. 90-91*



Hemavati: Kalyani Chalukya inscription. *See p. 92*



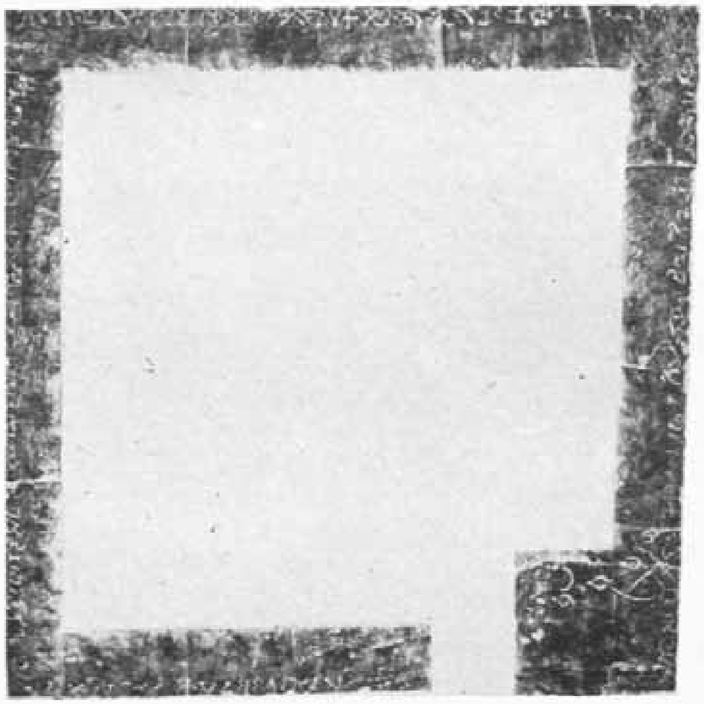


B



C

A, *Hoysala inscription from Sivaganga*; B and C, *Asokan Edicts from Sannati. See p. 93*



A



B

A, *Prakrit inscription from Lalitagiri*; B, *inscription of the Pandyas from Nakkaneri.*

See pp. 93-94



A



B



C

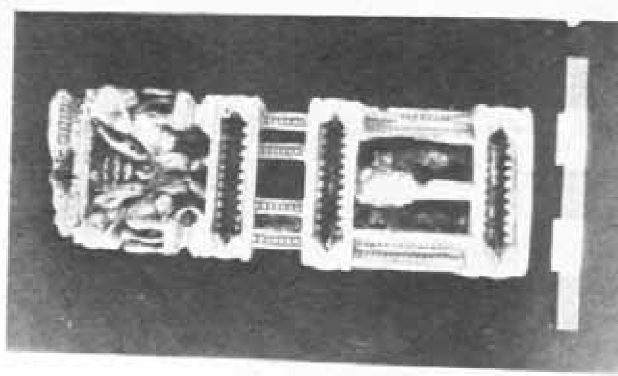
A, *inscription of the Mughals from Rohtak*; B, *inscription of Tughluq and Lodis respectively from Sahar*; *See pp. 97 and 99*



C



B



A

A, *stone lamp from Yaganti;* B *and* C, *inscribed stone mould from Naranag. See pp. 101 and 104*



A



B



C

A, *Archaeological Museum, Amaravati: mended sculpture of bull;* B-C, *Archaeological Museum, Chandragiri: image of Vishnu and Gopala. See pp. 113-114*



A



B

A, *Mattencherry palace Museum, Cochin: ornate brass vase;* B, *Archaeological Museum, Red Fort, Delhi: view of the Bahadur Shah Zafar gallery.* *See p. 114*

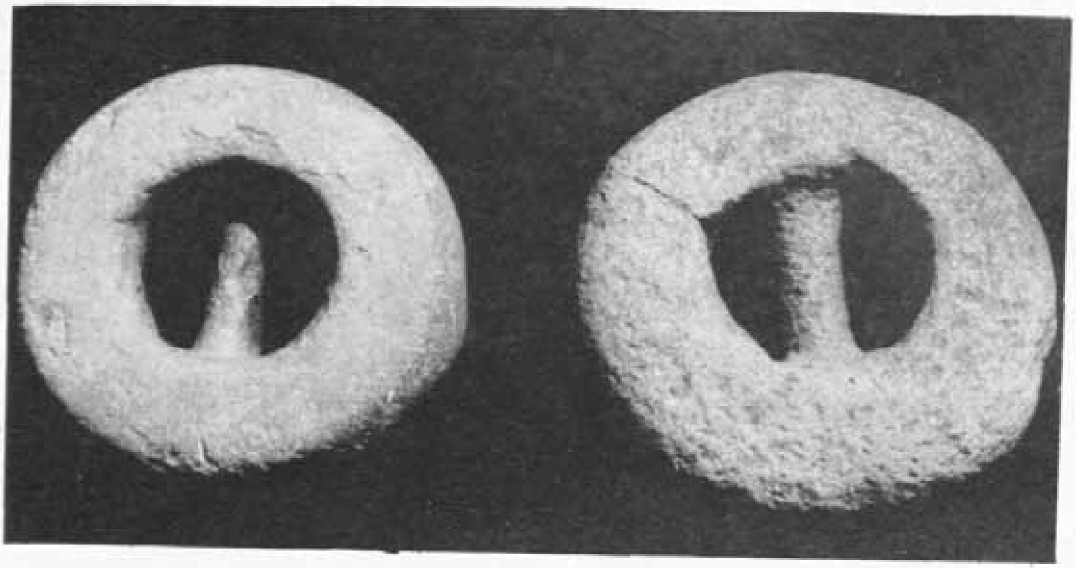


A

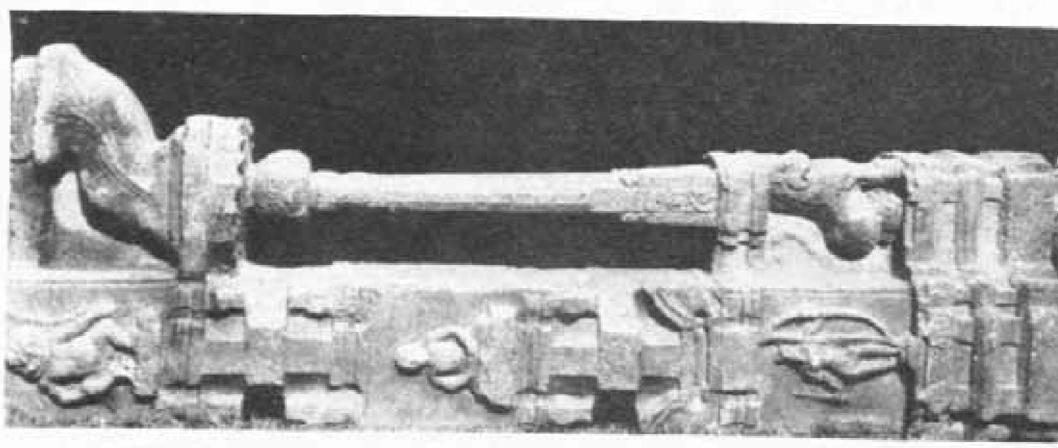


B

Archaeological Museum, Gwalior: view of, A, *Gallery 2 and* B, *main hall. See p. 114*



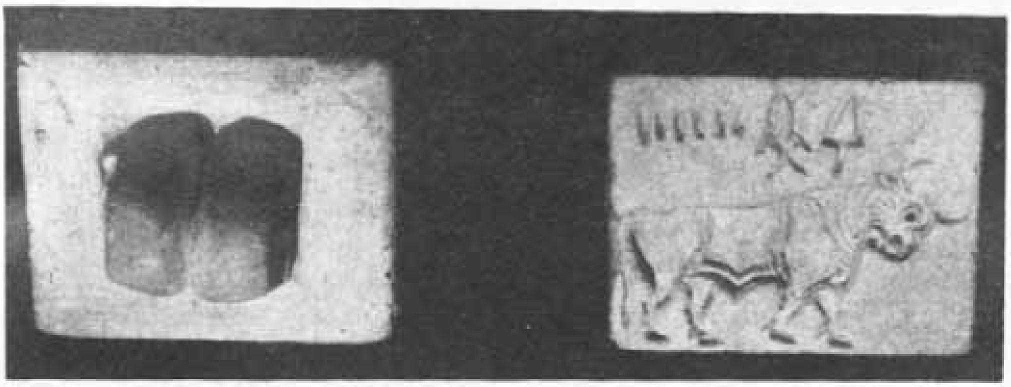
B



A

Archaeological Museum, Hampi: A, granite pillar from Tologrigatta; B, gymnasium weights from Anegondi.

See p. 115



A

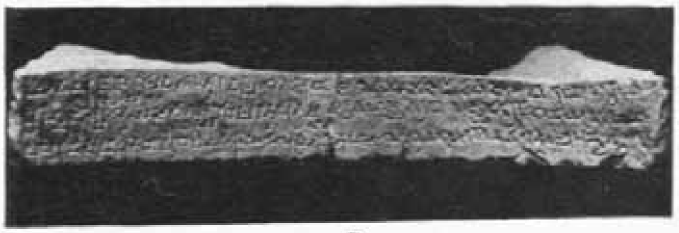


B

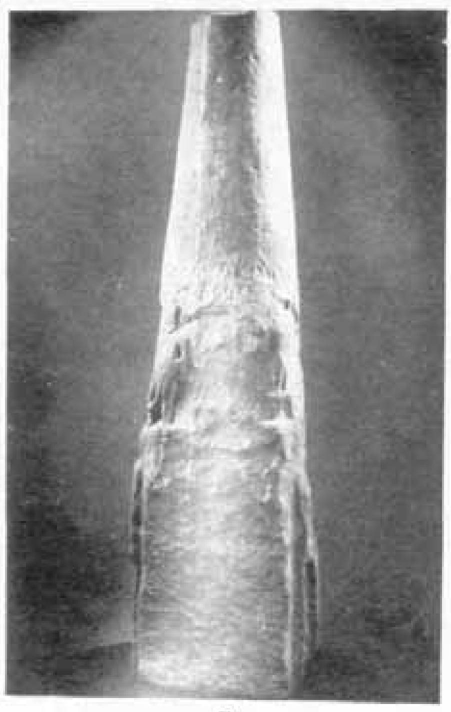
A, *Archaeological Museum, Kalibangan: Harappan sealing*; B, *Archaeological Museum, Khajuraho : image of Mahishasuramardini.* *See p. 115*



A



B



C

A, *Archaeological Museum, Lothal: Harappan seal;*
Government Museum, Mathura: B, *fragmentary stone inscription and* C,
inscribed ekamukha Siva-linga. See pp. 115-116



A



B

A, *Renuka Devi temple at Khalwa*; B, *Siva temple inside fort at Garhwa. See pp. 119 and 127*



B

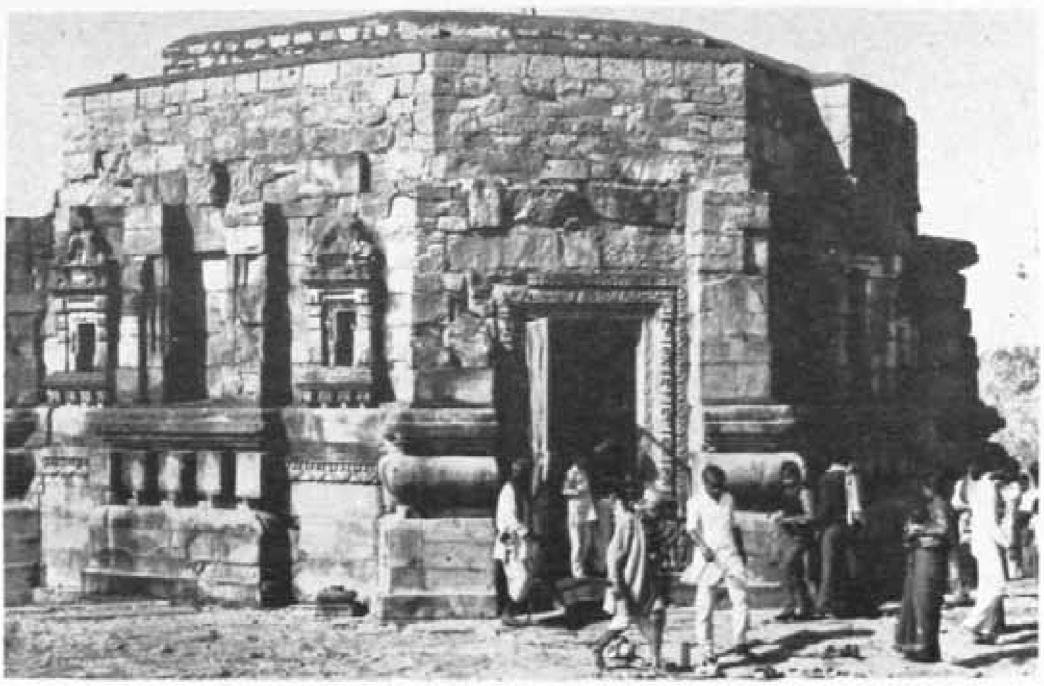


A

A, *Parsvanatha temple at Kethuli: image of Jaina Tirthankara;* B, *Dhawalamata temple, Dhawala: image of Uma-Mahesvara.* *See pp. 121-122*



A

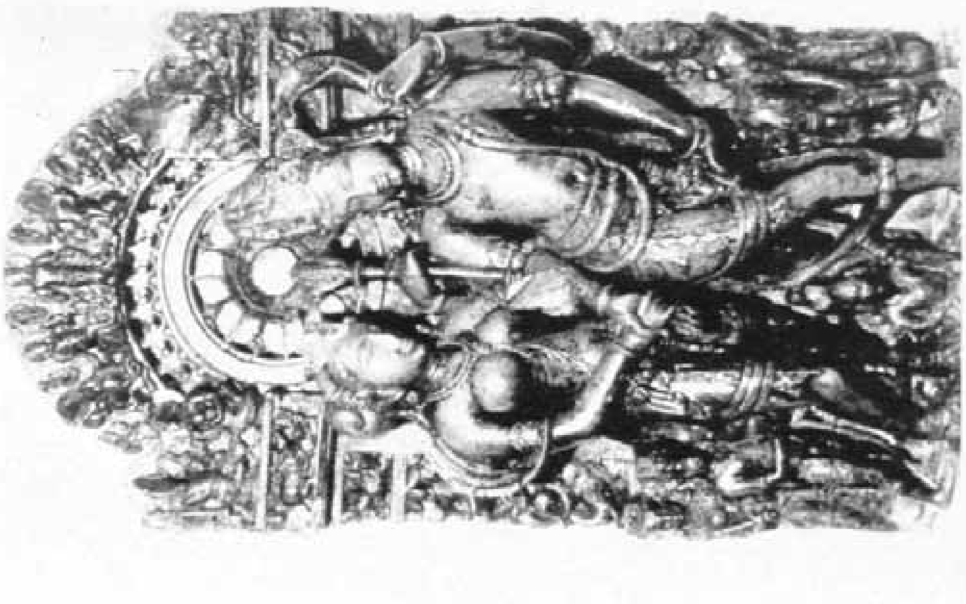


B

A, *Dhanvantari Mahadeva temple, Baijnath*; B, *Mundesvari temple, Ramgarh. See pp. 122 and 126*

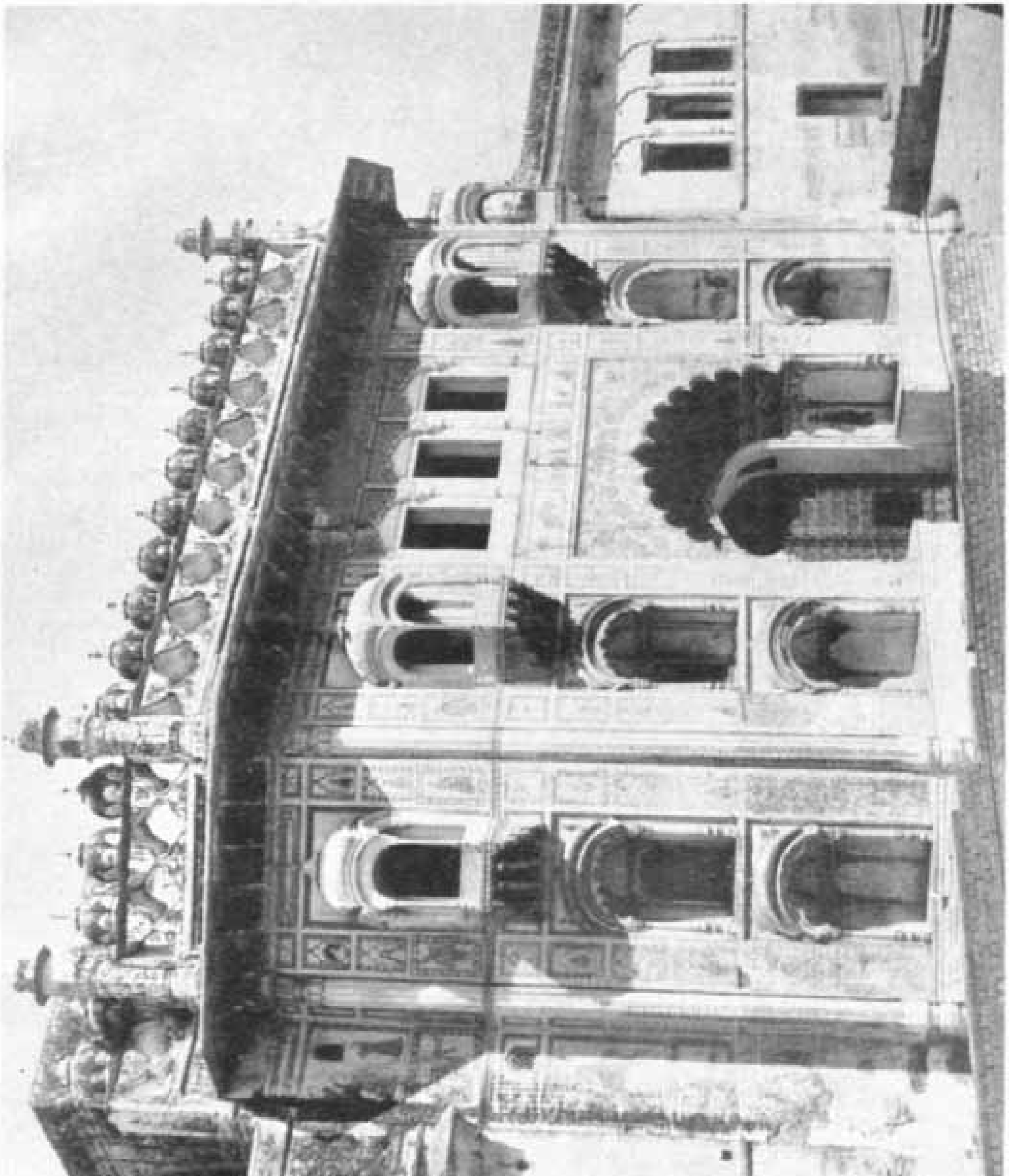


B

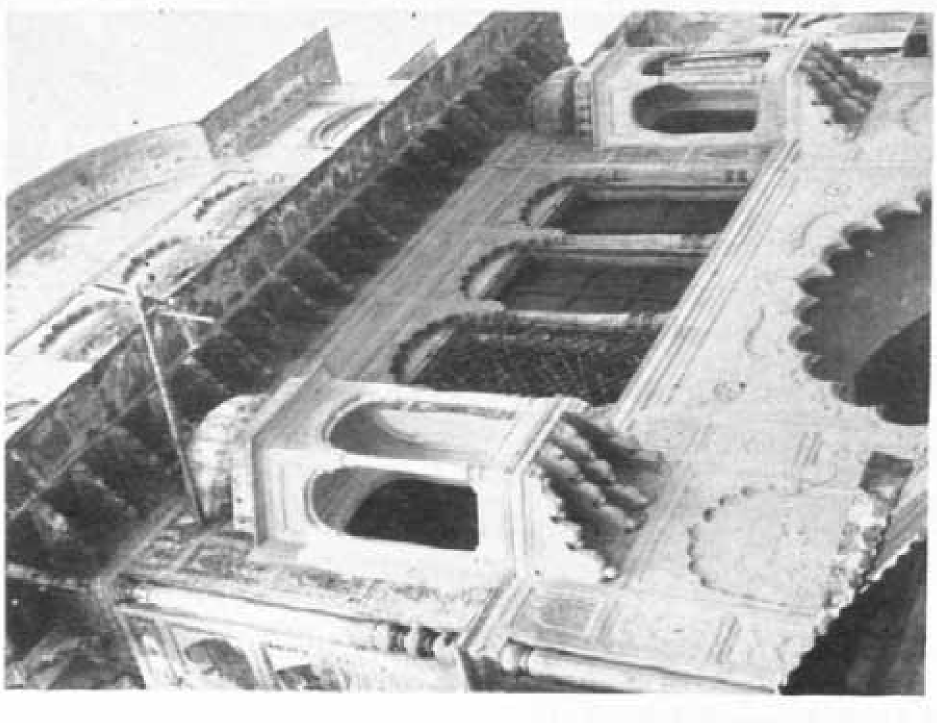


A

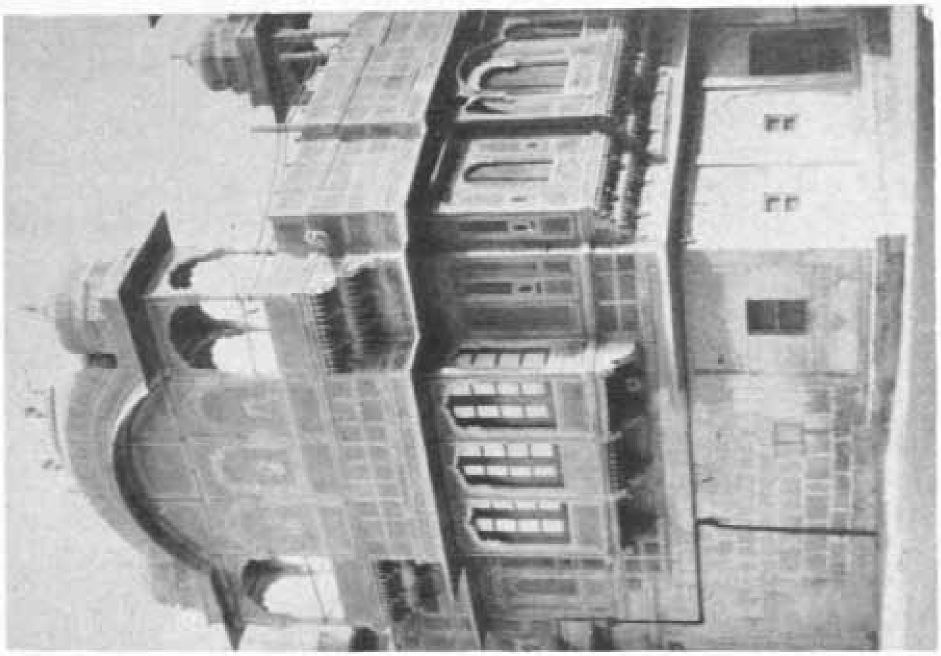
Vasudeva group of temples, Joshimath: image of, A, Uma-Parinayamurti and B, Ganesa. *See p. 127*



Kankhal: gateway of Dharamal-ka-Bagh. *See p. 127*

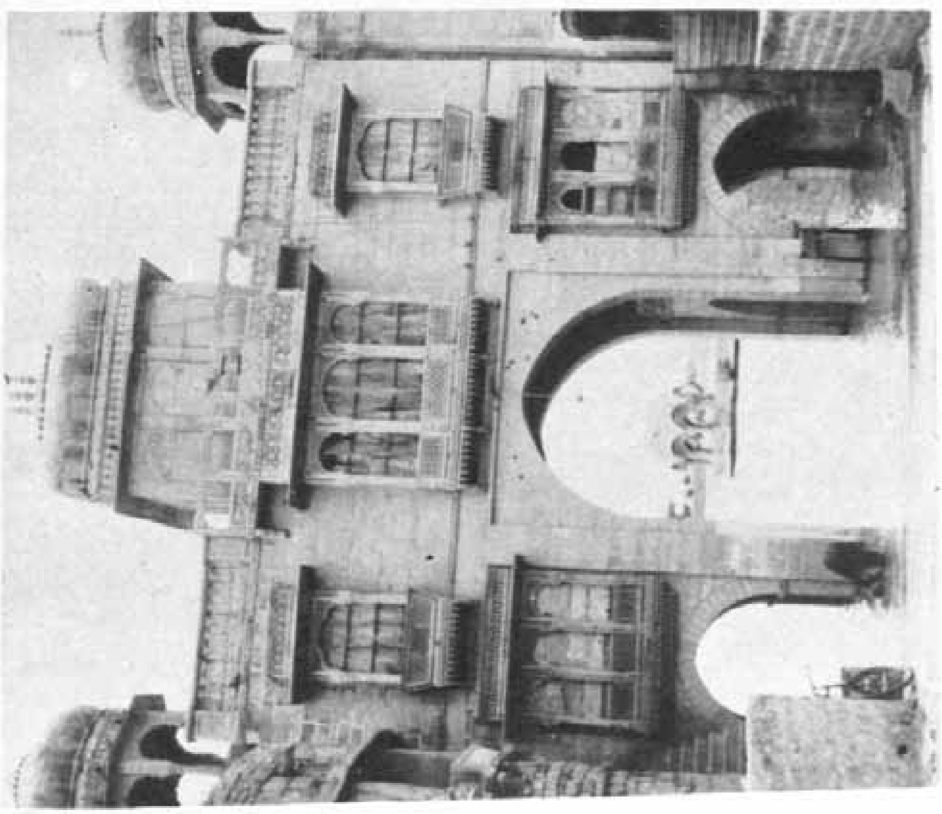


A

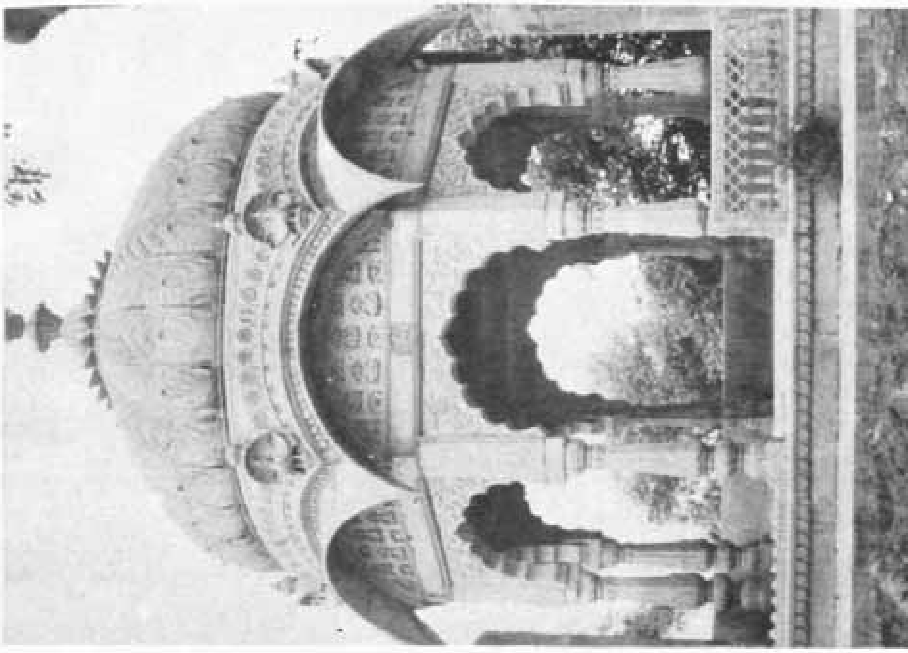


B

A, *Hardwar: Badri Bavla-ki-Haveli*; B, *Jaisalmer: view of the mandir palace.* *See p. 128*

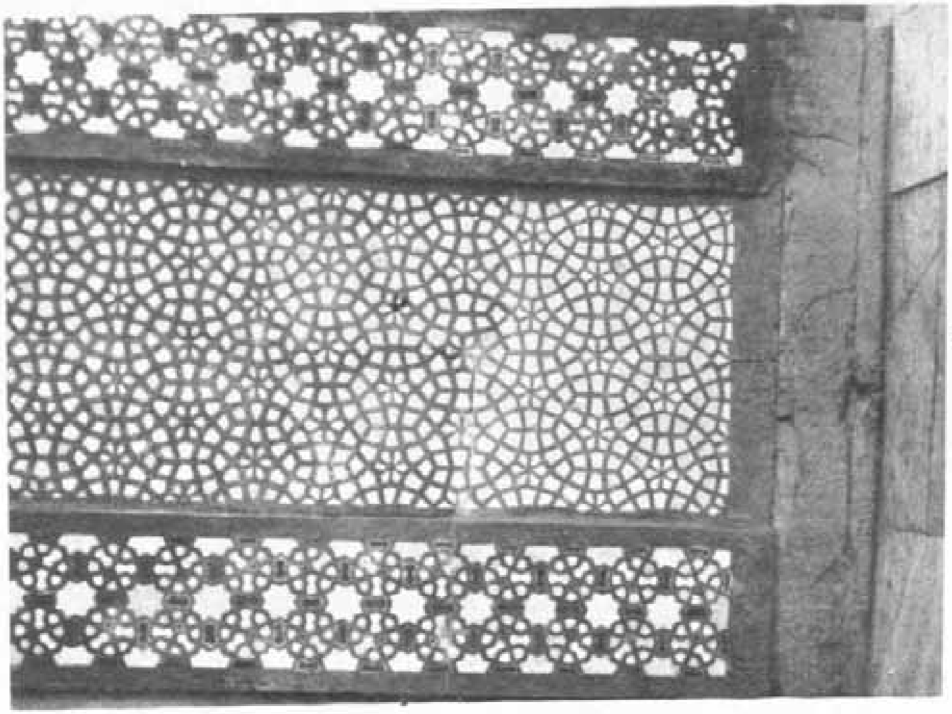


A

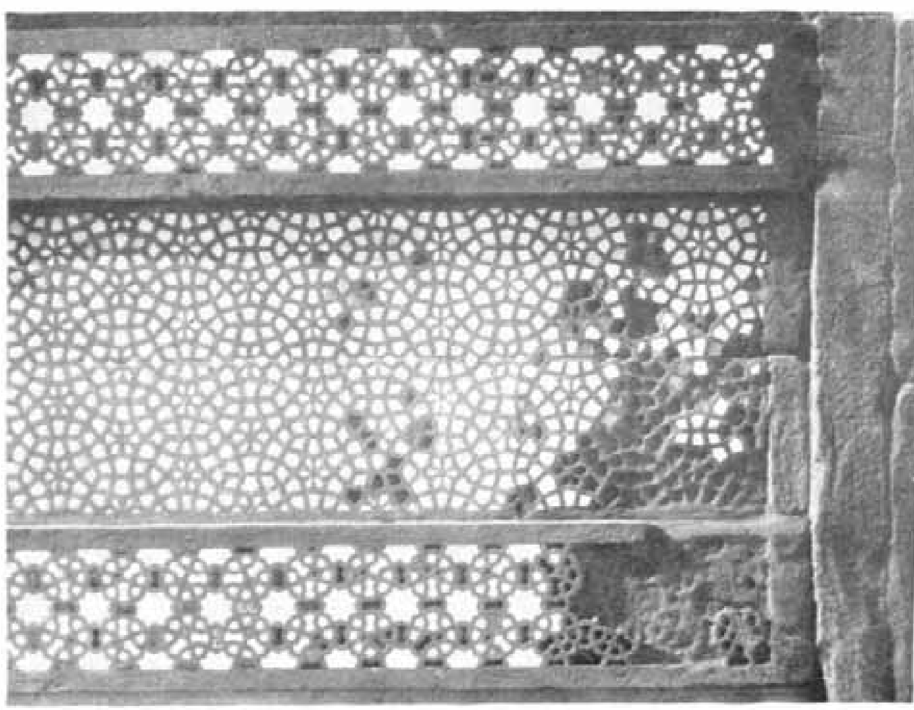


B

Jaisalmer: A, *gateway of Garhisar tank;* B, *chhatris of Mool Sagar. See p. 128*

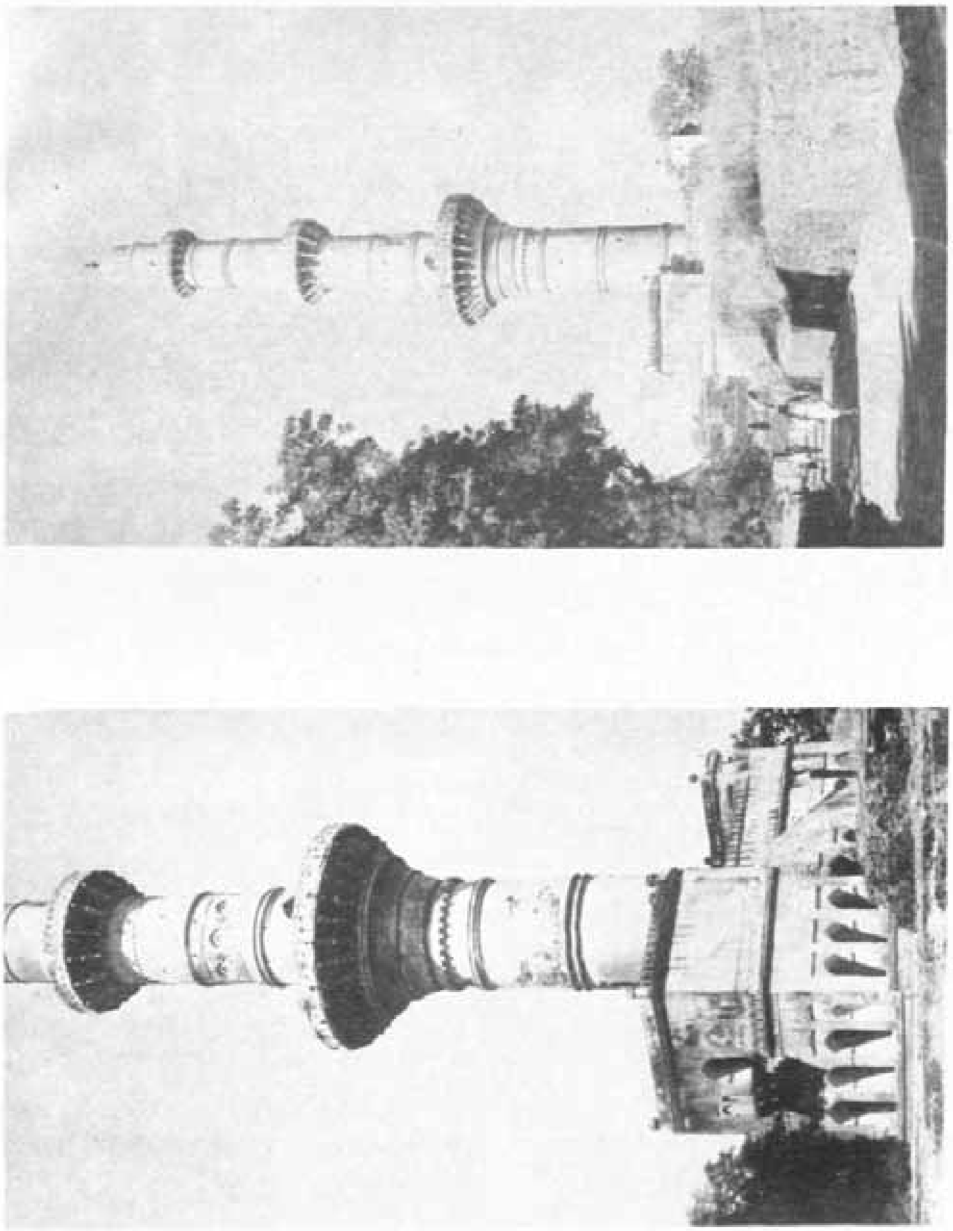


B



A

Agra, Jama Masjid: A, before and B, after restoration of inlay pieces. *See p. 131*



B

A

Daulatabad, fort. A, before and B, after repairs of Chand Minar. *See p. 133*



A



B

Daulatabad, fort: A, before and B, after conservation of damaged chhajja of the Hemadpanti temple. *See p. 133*



A



B

Bagali, Kallesvara temple: A, *before and* B, *after conservation. See p. 135*



A



B

Kamalapuram, Hazara Ramachandra temple: A, *before and* B, *after conservation of tank.*

See p. 135



A

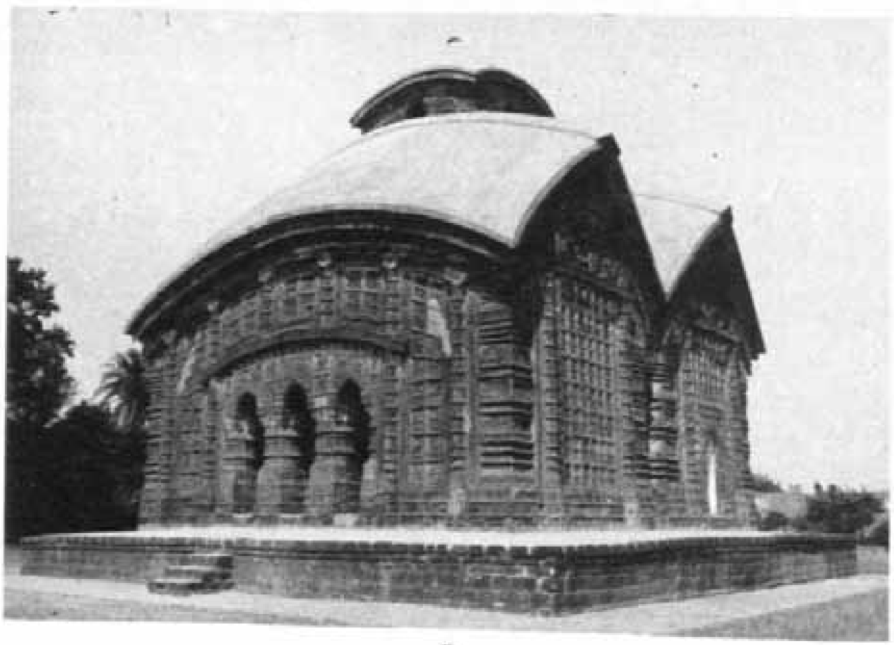


B

Nagaral Samat, Nagnatha temple: A, *before and* B, *after conservation. See p. 137*



A



B

Bishnupur, Jorbangla temple: A, *before and* B, *after conservation.* *See p. 146*

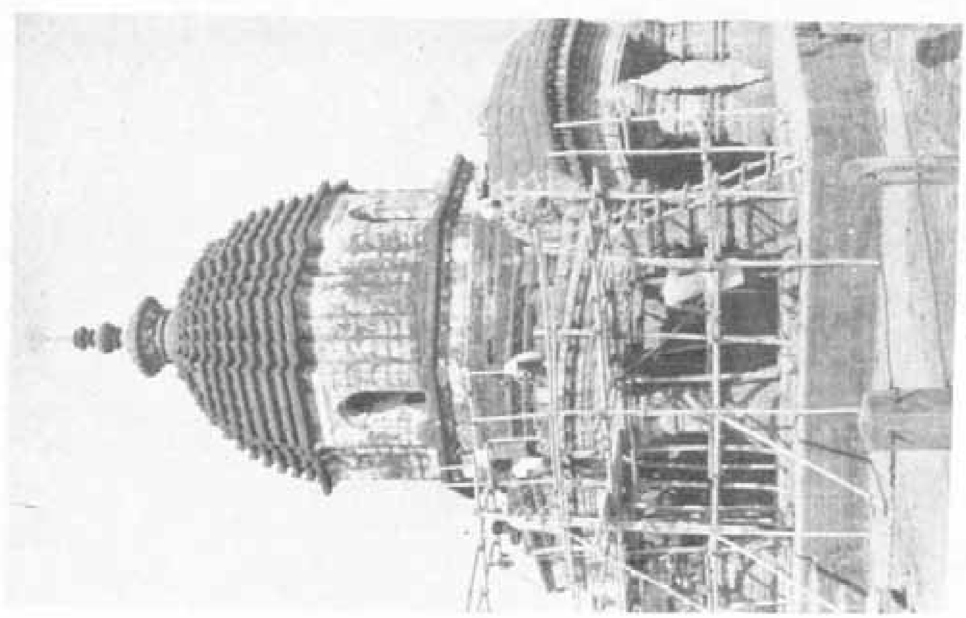


A

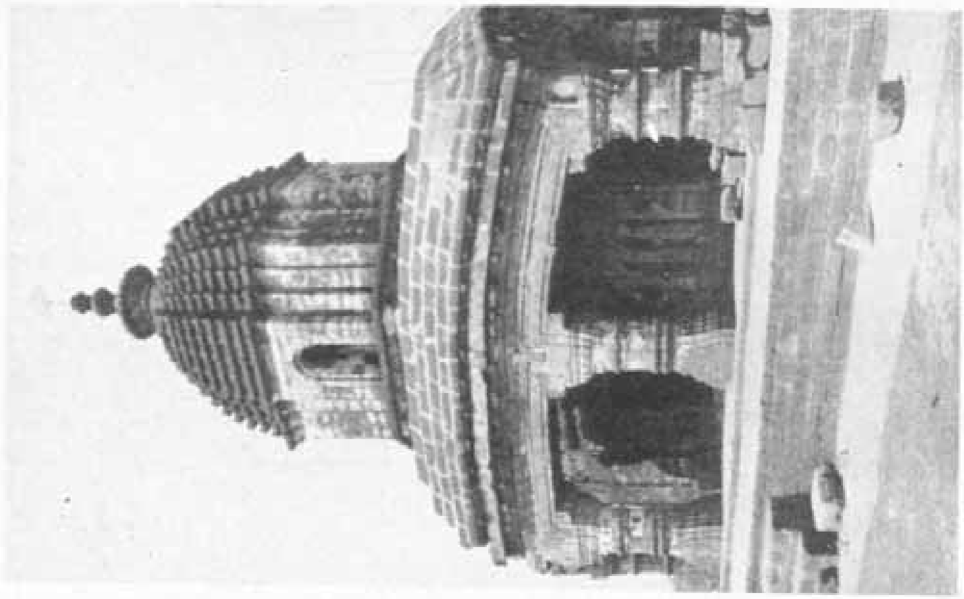


B

Bishnupur, Madana Mohana temple: A, *before and* B, *after conservation. See p. 146*

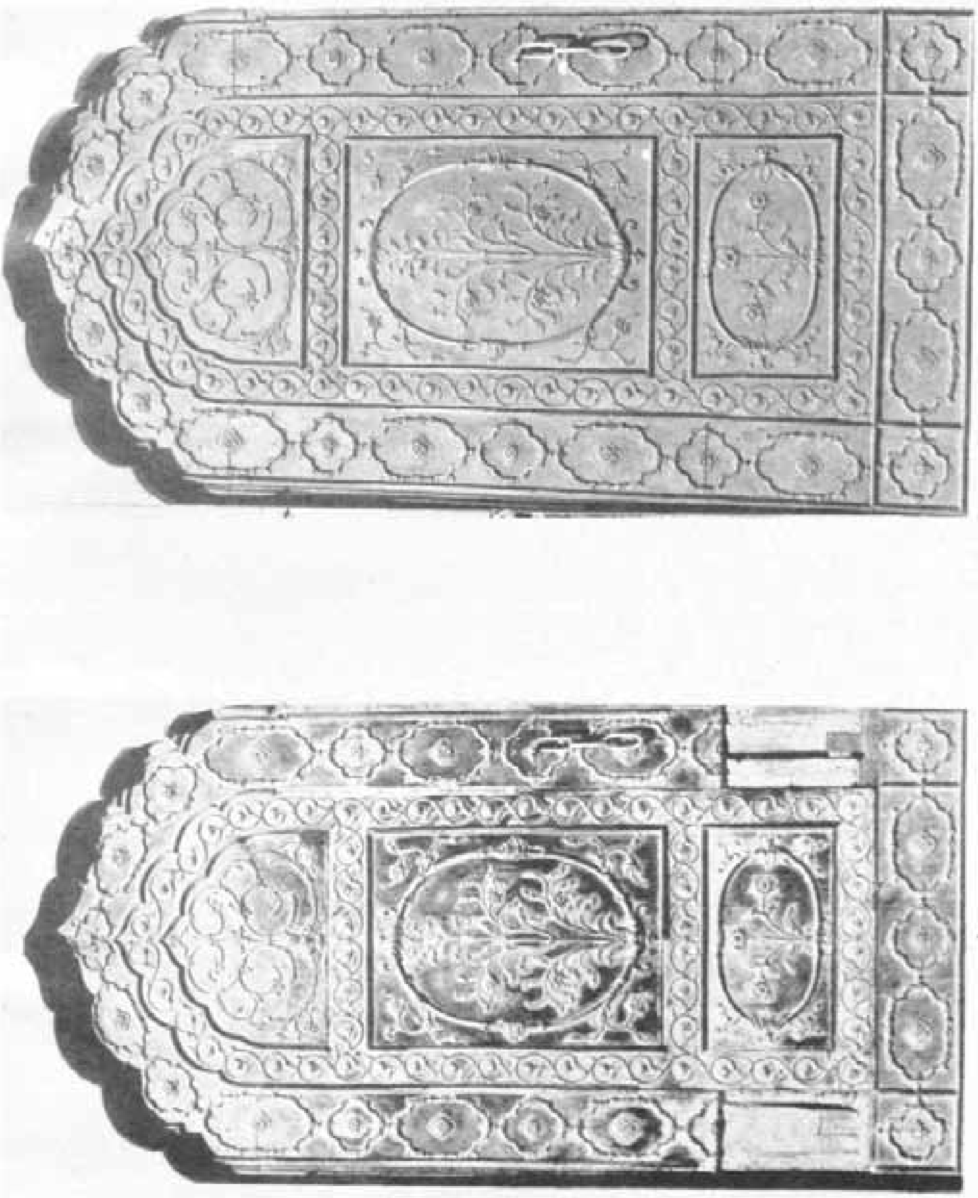


A



B

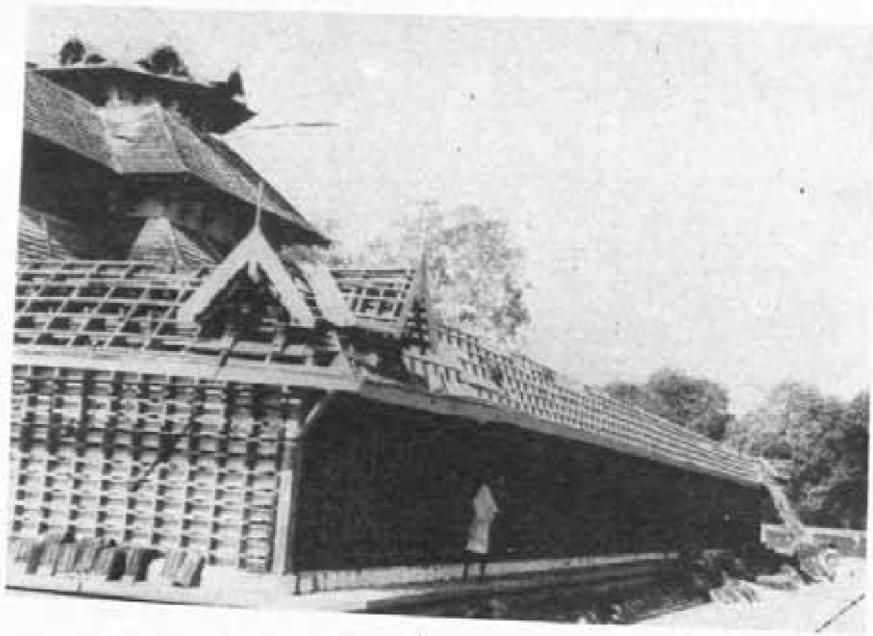
Bishnupur, Murali Mohana temple: A, *before and* B, *after conservation.* *See p. 146*



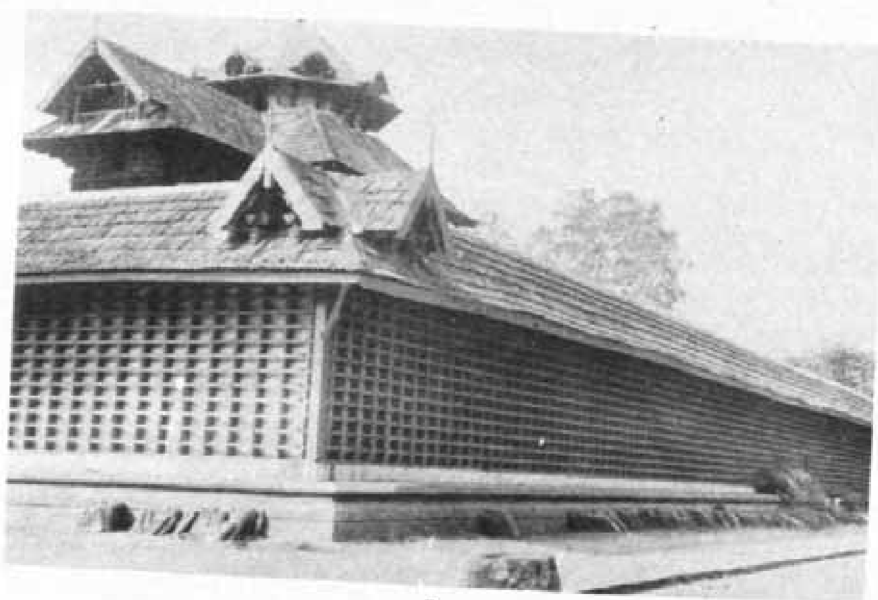
B

A

Delhi, Lal Qila: A, *before and* B, *after repairs of ornamental brass plates.* *See p. 149*



A



B

Peruvanam, Siva temple: A, *before and* B, *after conservation*. *See p. 156*

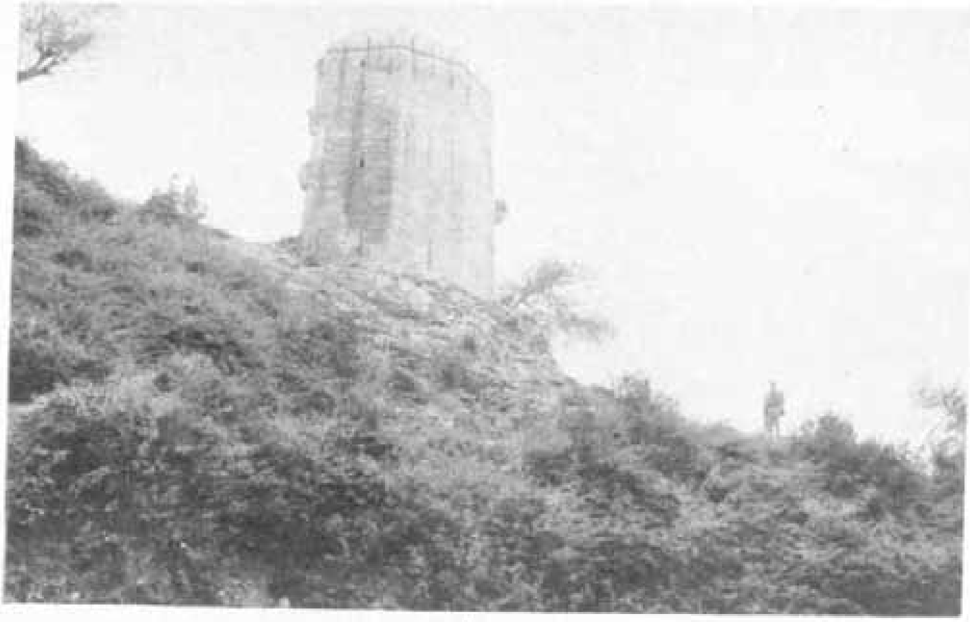


A



B

Kulathur, Soundaracholisvara temple: A, *before and* B, *after conservation.* *See p. 158*



A

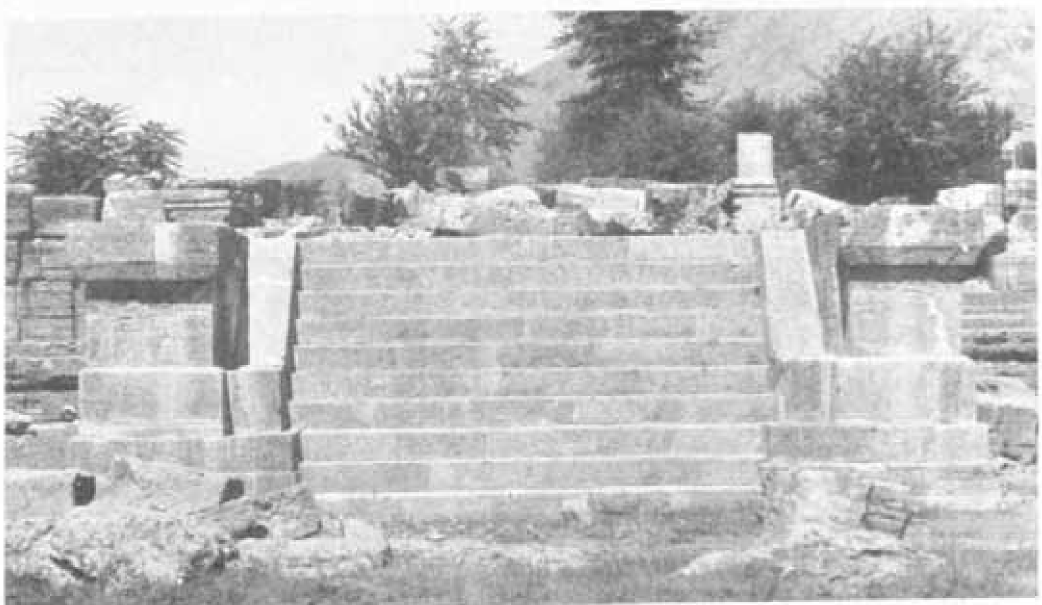


B

Akhnoor, Akhnoor fort: A, *before and* B, *after conservation.* *See p. 162*

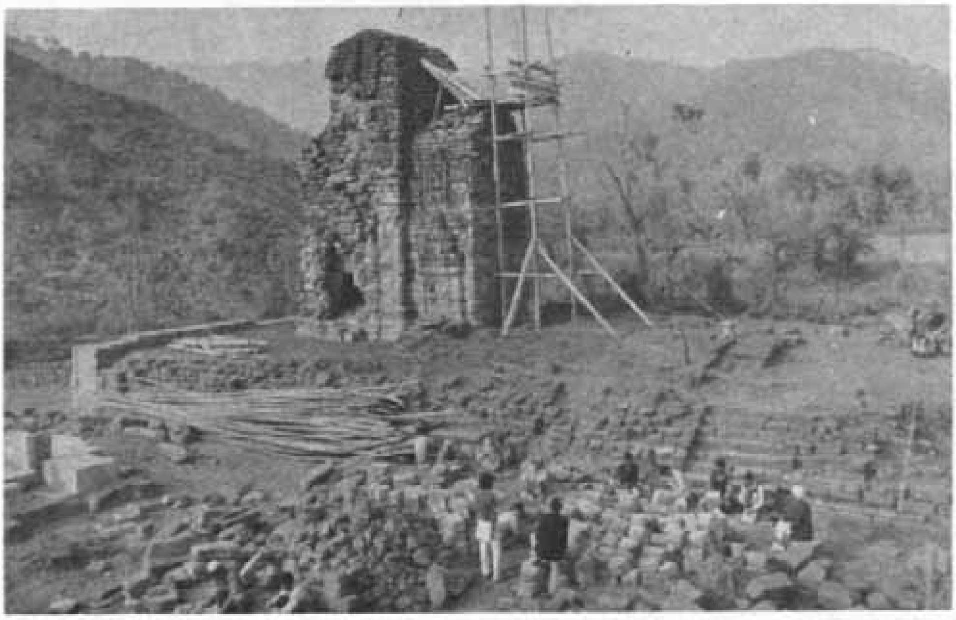


A



B

Awantipur, Avantiswara temple: A, before and B, after conservation. See p. 163

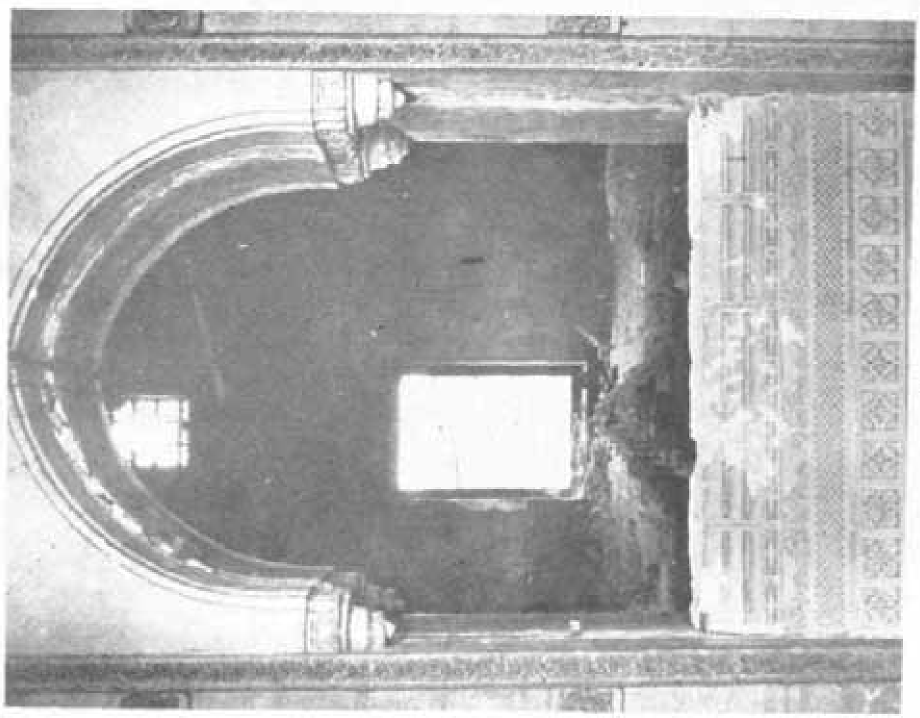


A

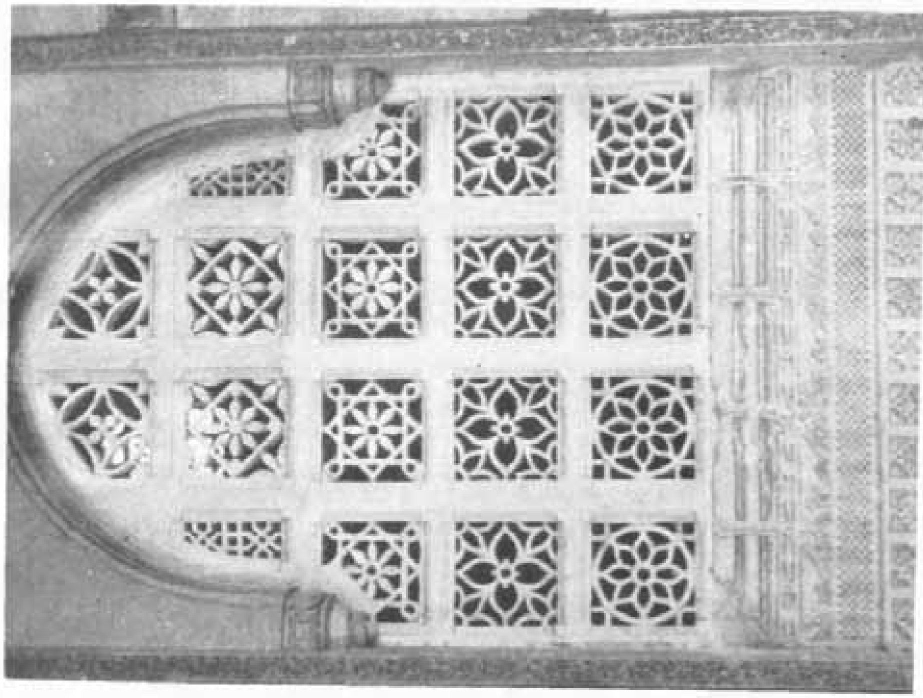


B

Kiramchi, Temple 4: A, *before and* B, *after conservation. See p. 164*

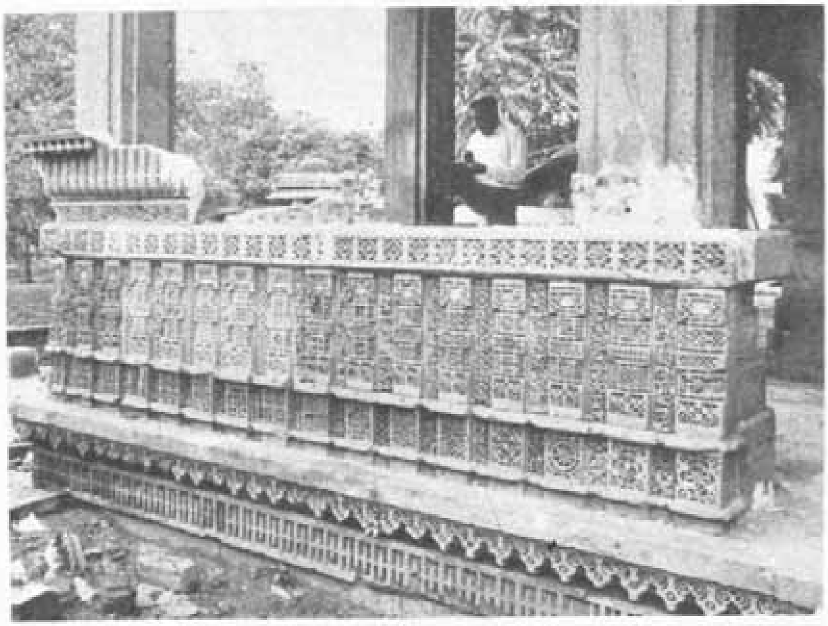


A

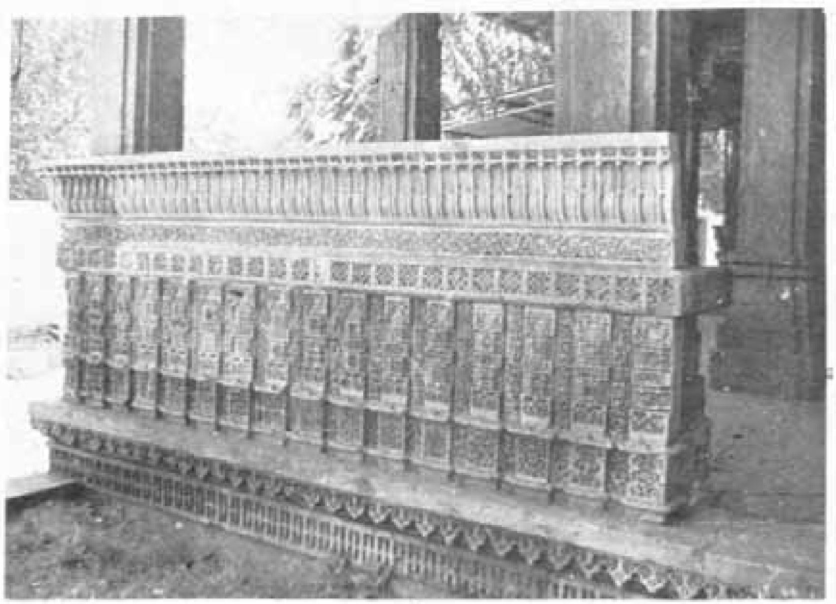


B

Ahmedabad, Dada Harir's tomb: A, *before and* B, *after conservation of jalis.* *See p. 165*

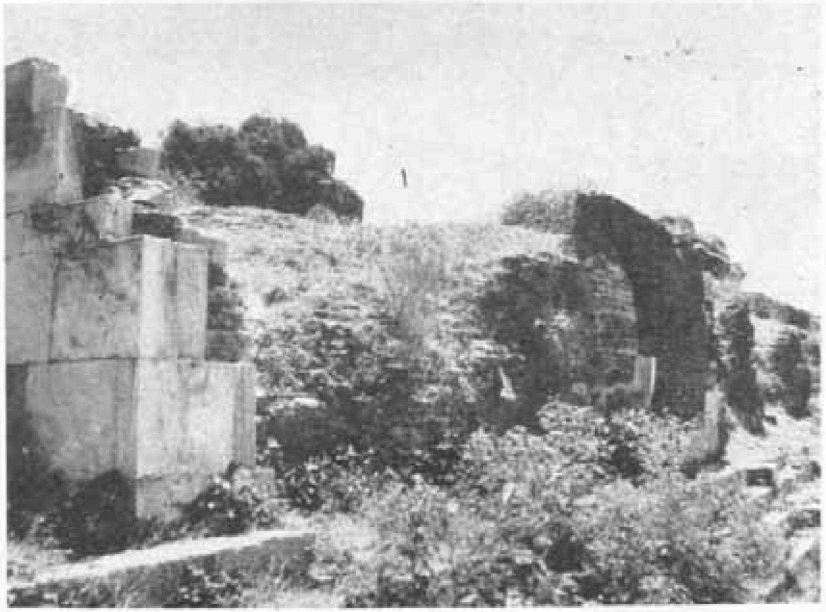


A

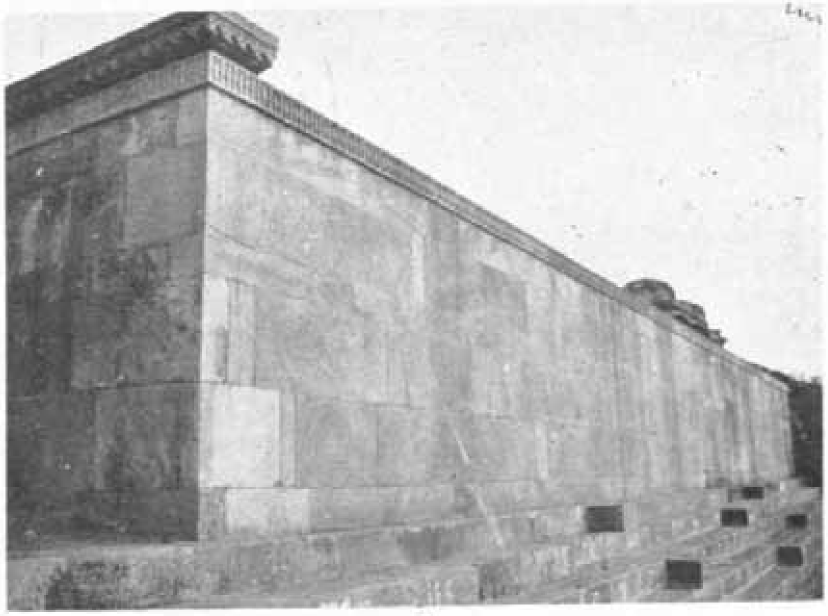


B

Ahmedabad, Dada Harir's tomb: A, *before and* B, *after reconstruction.* *See p. 165*



A



B

Sarkhej, great tank: A, *before and* B, *after conservation of eastern wall.* *See p. 165*



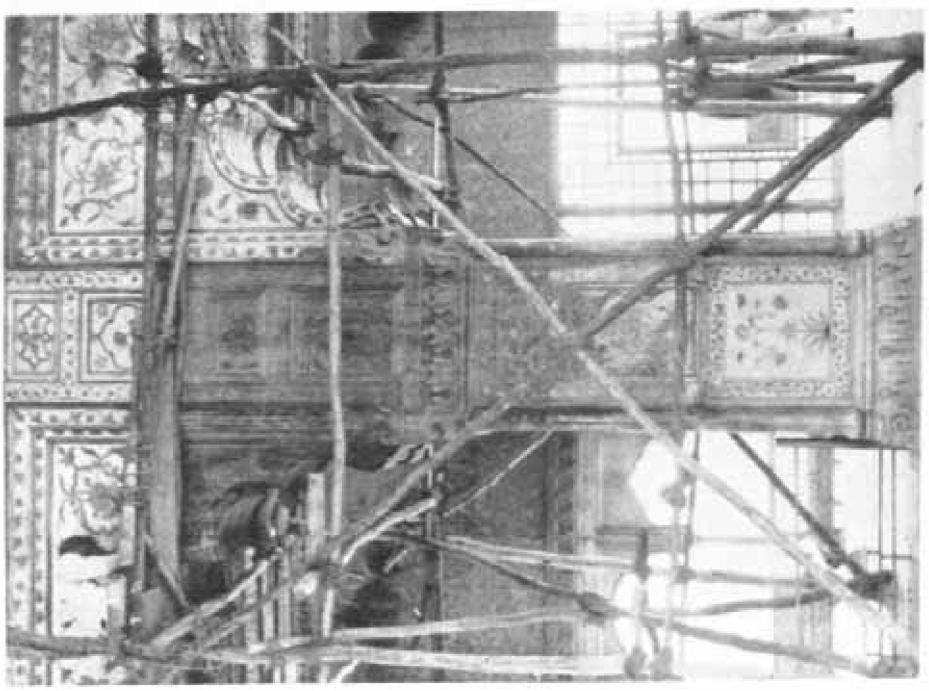
A



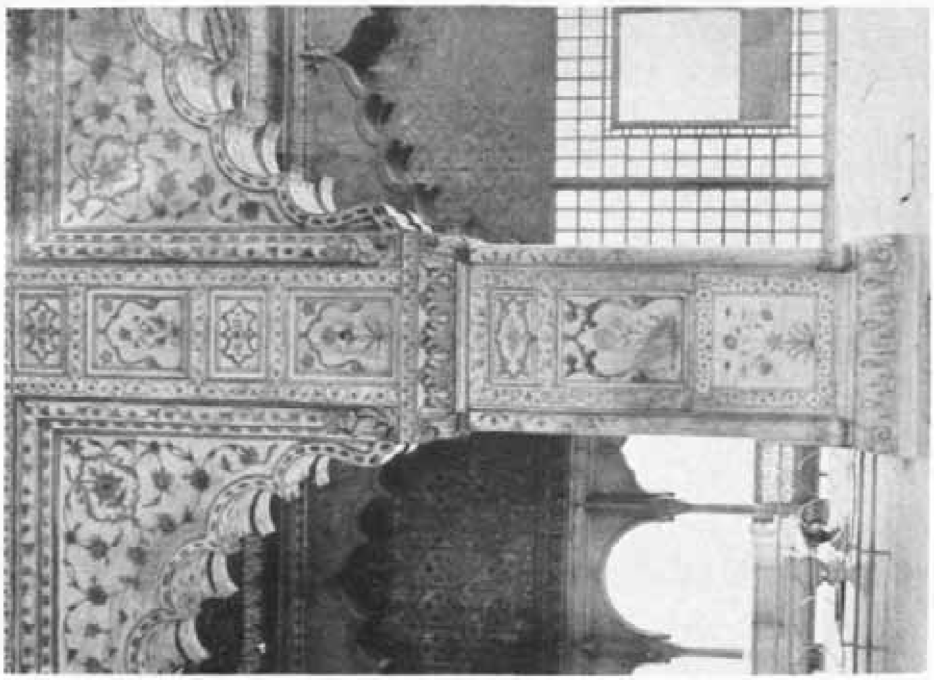
B

Daman, Daman Monuments: A, before and B, after chemical treatment of paintings.

See p. 173

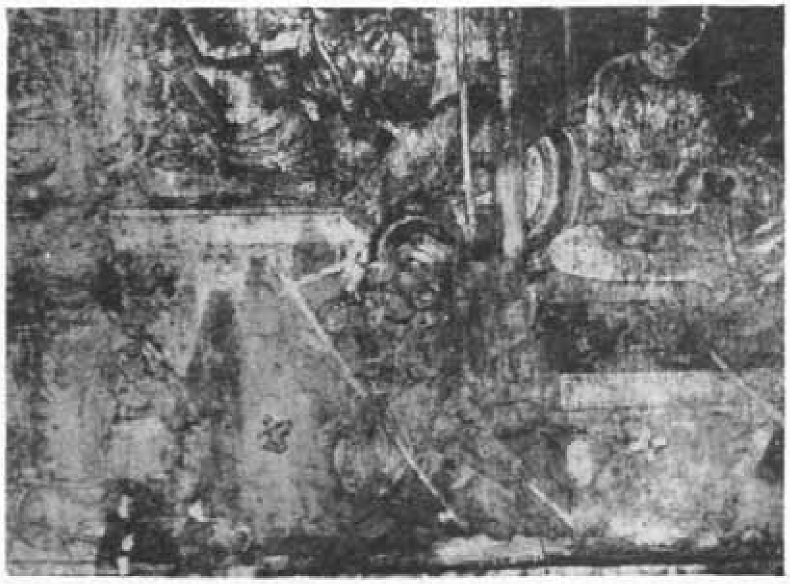


A



B

Delhi, Red Fort: A, during and B, after treatment. *See p. 173*



A



B

Ajanta, Cave 17: A, *before and* B, *after treatment. See p. 178*

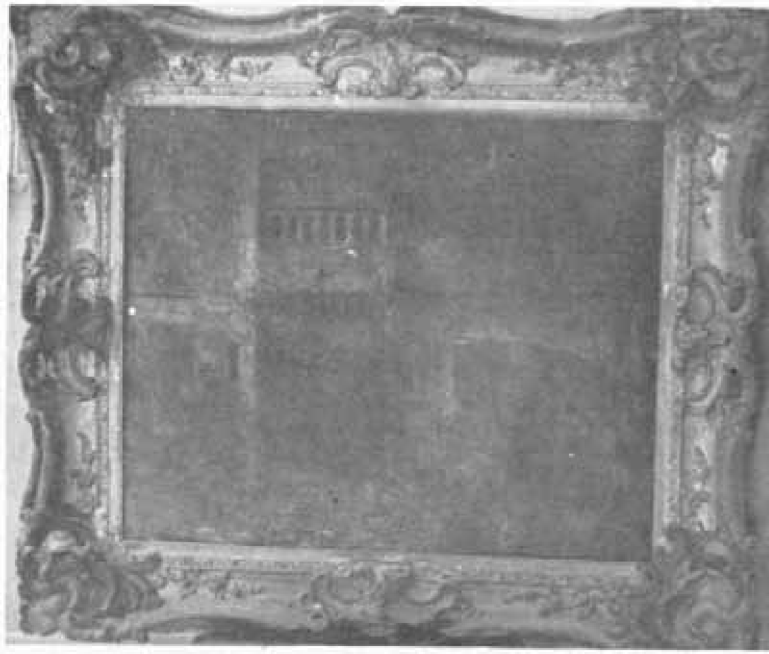


A



B

Agra, Taj Mahal: A, before and B, after treatment: See p. 181



A



B

Murshidabad, Hazarduari palace: A, before and B, after treatment of paintings.

See p. 183